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Determinate and Indeterminate Dimensions: Does Thomas Aquinas Change His Mind on Individuation?

Gaston G. LeNotre

Abstract. The scholarly consensus is that Thomas Aquinas's views about individuation changed over time. The consensus states that he wavered in his opinion about whether determinate dimensions or indeterminate dimensions serve in the individuation of corporeal substances. I argue that this consensus is mistaken. I focus on early texts of Thomas to argue that he relies on different types of dimensions to answer different problems of individuation. Determinate dimensions resolve a problem in the order of perfection, and indeterminate dimensions resolve a problem in the order of generation. I explain texts that answer the problem of individuation in the order of perfection according to questions about universals, cognition, and science. I then explain texts that answer the problem of individuation in the order of generation. My conclusion argues that, despite abandoning the language, Thomas continues later in his career to rely on indeterminate dimensions to resolve the problem of individuation in the order of generation.

I. Framing the Problem of Individuation in Aquinas's Writings

Among its many contributions, the recent *Oxford Handbook of Aquinas* includes Jeffrey Brower's "Matter, Form, and Individuation" and Giorgio Pini's "The Development of Aquinas's Thought." The two entries agree that Thomas Aquinas's "views about individuation seem to have changed over time."[1] According to Pini, Thomas "wavered in his opinion about

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[1] See Jeffrey E. Brower, "Matter, Form, and Individuation," in *The Oxford Handbook of Aquinas*, ed. Brian Davies and Eleonore Stump (New York: Oxford University Press, 2011), 85–103, esp. 102n28. Brower maintains the same position and refers to John Wippel in these articles: "Aquinas on the Individuation of Substances," *Oxford Studies in Medieval Philosophy*, vol. 5, ed. Robert Pasnau (Oxford: Oxford University Press, 2017), 122–50, esp. 124; "Aquinas on the Problem of Universals," *Philosophy and Phenomenological Research* 92 (2016): 715–35, esp. 725n5; Jeffrey E. Brower and Susan Brower-Toland, "Aquinas on Mental Representation: Concepts and Intentionality," *The Philosophical Review* 117 (2008): 193–243, esp. 213n32.

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the role that determinate or indeterminate dimensions play in the individuation of material things."[2] Brower and Pini suggest various texts from Thomas and then refer to John Wippel's monograph. For his part, Wippel concludes through a chronological study that Thomas alternates "more than once" between determinate and indeterminate dimensions early in his career only to abandon indeterminate dimensions altogether later in his career.[3] In general, determinate (defined, terminated, or designated) dimensions are those accidental forms of quantity with position that are perfectly actual and fixed dispositions of matter such as *this* Labrador's length, breadth, and width; in contrast, indeterminate (undefined, unterminated, or non-designated) dimensions are those same forms of quantity with position that are predispositions of matter, neither perfectly actual nor fixed to the here-and-now. The scholarly consensus now seems settled with the view that Thomas changed his mind on the individuating role for each type of dimensions. For example, Fabrizio Amerini asserts bluntly, "it is well known that Thomas changed his mind on the role of extension in the process of substantial individuation."[4] If Thomas had recurrently changed his mind on the role of dimensions, as it is claimed, then it would be "perhaps his most dramatic change of mind in any area."[5] Some interpreters escape the melee by discovering a hitherto unknown principle of individuation in Thomas based on either "existence,"[6] "existential relation,"[7] or "spatio-temporal dimensions,"[8] and these novel interpretations are themselves debated.[9]

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[2] Giorgio Pini, "The Development of Aquinas's Thought," in *The Oxford Handbook of Aquinas*, ed. Brian Davies and Eleonore Stump (New York: Oxford University Press, 2011), 491–510, esp. 510n47.

[3] John F. Wippel, *The Metaphysical Thought of Thomas Aquinas: From Finite Being to Uncreated Being* (Washington, D.C.: Catholic University of America, 2000), 351–75. "In spite of efforts on the part of some to prove that Thomas never changed his mind concerning the kind of dimensions involved in individuation, it seems clear from the texts we have examined that he did, and more than once" (371). For another author who refers to Wippel's analysis, see Eleonore Stump, *Aquinas* (New York: Routledge, 2003), 485n59. Also by Stump, "Aquinas's Metaphysics: Individuation and Constitution," in *Categories: Historical and Systematic Essays. Studies in Philosophy and the History of Philosophy*, ed. Michael Gorman and Jonathan J. Sanford (Washington, D.C.: The Catholic University of America Press, 2004), 33–44. "Aquinas does not always describe his position on this score in the same way, and the variation in terminology suggests to some scholars either a development in his thought or a series of changes of mind. The issue is complicated, and so I am leaving it to one side here" (36n8).

[4] Fabrizio Amerini, *Aquinas on the Beginning and End of Human Life*, trans. Mark Henninger (Cambridge, MA: Harvard University Press, 2015), 151. For other notable and recent examples of the consensus view, see Pasquale Porro, *Thomas Aquinas: A Historical and Philosophical Profile*, trans. Joseph G. Trabbic and Roger W. Nutt. (Washington, D.C.: The Catholic University of America Press, 2016), 51n54; Jorge J. E. Gracia, "A Scholastic Perspective on the Individuation of Races," in *The Science of Being as Being: Metaphysical Investigations*, ed. Gregory T. Doolan, (Washington, D.C.: The Catholic University of America Press, 2012), 129–53, esp. 145n22; Silvia Donati, "Materia e dimensioni tra XIII e XIV secolo: la dottrina delle dimensiones indeterminatae," *Quaestio* 7 (2007): 361–93, esp. 367–71; Lawrence Dewan, "The Individual as a Mode of Being according to Thomas Aquinas," *The Thomist* 63 (1997): 403–24. Reprinted in *Form and Being: Studies in Thomistic Metaphysics* (Washington D.C.: The Catholic University of America Press, 2006), 229–48, esp. 231n7. Citations refer to the monograph edition.

I shall argue that the consensus is mistaken. Thomas's treatment of individuation touches on many topics and raises many questions. He relies on individuation to explain accidents, intelligible species, the human soul, the Eucharist, and the resurrected body. Questions surface about the status of universals, the relation between matter and dimensions, and the coherence of a theory rooted in dimensive quantity. But I shall resolve a more basic question. Do Thomas's different statements about individuating dimensions reveal, if not a frequent and recurring contradiction, a genuine shift in positions?[10] Although his terminology changes somewhat later in his career, Thomas does not waver in his position about determinate and indeterminate dimensions. A careful analysis of the texts reveals that Thomas relies on different types of dimensions to individuate distinct types of matter. Designated matter is always the principle of individuation for corporeal substances. And matter is designated in different ways depending on the type of matter in question: either prime matter, which is co-principle to the substantial form (i.e., the form of the part, *forma partis*), or common matter, which is included in the common nature (i.e., the form of the whole, *forma totius*).[11]

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[5] Robert Pasnau, *Metaphysical Themes 1274–1671* (New York: Oxford University Press, 2011), 64. The reference is to Thomas's stance on indeterminate dimensions.

[6] Joseph Owens, "Thomas Aquinas: Dimensive Quantity as Individuating Principle," *Mediaeval Studies* 50 (1988): 279–310; and "Thomas Aquinas (B. ca. 1225; D. 1274)," in *Individuation in Scholasticism: The Later Middle Ages and the Counter Reformation*, 1150–1650, ed. Jorge J. E. Gracia (Albany, NY: SUNY Press, 1994), 173–94. Owens's interpretation attracts many followers: Armand A. Maurer, *St. Thomas Aquinas: Faith, Reason and Theology: Questions I–IV of his Commentary on the* De Trinitate *of Boethius translated with Introduction and Notes* (Toronto: Pontifical Institute of Mediaeval Studies, 1987), xxxv; Kevin White, "Individuation in Aquinas's *Super Boethium De Trinitate*, Q. 4," *American Catholic Philosophical Quarterly* 69 (1995): 543–56; Timothy B. Noone, "Individuation in Scotus," *American Catholic Philosophical Q uarterly* 69 (1995): 527–42; Linda L. Farmer, "The Individuation Debate," *The Modern Schoolman* 53 (2002): 55–63; Montague Brown, "Aquinas and the Individuation of Human Persons Revisited," *International Philosophical Quarterly* 43 (2003): 167–85. Also, Jorge J. E. Gracia, "Numerical Continuity in Material Substances: The Principle of Identity in Thomistic Metaphysics," *Southwestern Journal of Philosophy* 10 (1979): 73–92.

[7] Stephen Hipp, "Existential Relation as a Principle of Individuation," *The Thomist* 72 (2008): 67–106; Thomas DePauw, "The Principle of Distinction in Material Substances in the Philosophy of St. Thomas and St. Albert," *American Catholic Philosophical Quarterly* 92 (2018): 583–614; John Gerard Desilva Finley, "Human Individuation in Aquinas," (PhD diss., University of Dallas, 2010).

[8] Michael Potts, "The Spatio-Temporal Theory of Individuation," *The Thomist* 59 (1996): 59–68, esp. 61; Adam Wood, "Mind the Gap? The Principle of Non-Repeatability and Aquinas's Account of the Resurrection," *Oxford Studies in Medieval Philosophy* 3 (2015): 99–127, esp. 114–17; Henry Veatch, "Essentialism and the Problem of Individuation," *Proceedings of the American Catholic Philosophical Association* 48 (1974): 64–73, esp. 69. Time and place are rather annexes or adjuncts to sensible matter; they necessarily flow from the individuating principles and indicate them as a sign (*sicut signum*). For Thomas's explicit rejection of space (*locus*) and time as the cause of numerical diversity (i.e., individuation), see *De Trinitate* q. 4, a. 4 ad s.c. 1 & 3. For related texts on time as an extrinsic measure, see *De potentia* q. 3, a. 17; *De potentia* q. 9, a. 7; *ST* I, q. 10, a. 1. Texts of Aquinas are cited according to the Leonine edition where available; his commentary on the *Sentences* is cited according to Mandonnet and Moos where available; and *De potentia* and the commentary on *Metaphysics* are cited according to the Marietti edition.

[9] Against the "existence" interpretation, see Dewan, "The Individual as a Mode of Being"; James B. Reichmann, "Scotus and *Haecceitas*, Aquinas and *Esse*: A Comparative Study," *American Catholic Philosophical Quarterly* 80 (2006): 63–75; Wippel, *Metaphysical Thought of Thomas Aquinas*, 373–75. Against the "spatio-temporal" interpretation, besides my brief comment and references in note 8, see Andrew Payne, "Gracia and Aquinas on the Principle of Individuation," *The Thomist* 68 (2004): 545–75.

As it turns out, Joseph Bobik has already shown in Thomas's writings these two distinct contexts for the individuation of corporeal substances. In an article written in French (1953), Bobik divides Thomas's texts on individuation according to this basic distinction between common matter and prime matter. He finds this distinction applied to dozens of explicit and implicit references to determinate and indeterminate dimensions and concludes that Thomas handles the principle of individuation from "two distinct points of view."[12] Bobik's initial article lays the groundwork for reconciling Thomas's various statements, but it has been ignored by interpreters and is incomplete. Indeed, Bobik himself hardly skirts the distinction in his more well-known "superseding" article in English (1954).[13] Bobik's earlier article moreover leaves puzzles unresolved. Thomas's *De Trinitate* (q. 4, a. 2) baldly argues, for example, that determinate dimensions *cannot* individuate and that only indeterminate dimensions individuate. Rather than continuing to appeal to different contexts as his earlier article partially achieved, Bobik's later article mistakenly tries to resolve the apparent conflict in *De Trinitate* by reducing the role of indeterminate dimensions to that of determinate ("terminated") dimensions. Determinate or terminated dimensions are the actual and here-and-now static dispositions of matter. Since "only terminated dimensions exist," Bobik argues, "only terminated dimensions contribute to individuation."[14] Bobik's later answer that indeterminate dimensions only individuate *insofar as they are determinate* mistakenly assumes that something only serves as a principle of individuation insofar as it exists.

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[10] Answering whether Thomas changes his mind on a major philosophical issue such as individuation does not merely involve "subtle exegetical questions" as one prominent author suggests. Knowing whether an author changes his mind between *X* and *Y* means knowing the rationale for the repeated reliance on *X* and *Y*.

[11] For material substances, the form of the whole is identical to the essence; it signifies the nature of the species and includes both prime matter and substantial form. For the distinction between *forma partis* and *forma totius*, see *In V Meta*. lect. 5, no. 822; *In VII Meta*. lect. 7, no. 1467–9; *ScG* IV, 81, no. 10.

[12] Joseph Bobik, "La doctrine de saint Thomas sur l'individuation des substances corporelles," *Revue Philosophiques de Louvain* 51 (1953): 5–41, esp. 37.

[13] Joseph Bobik, "Dimensions in the Individuation of Bodily Substances," *Philosophical Studies* 4 (1954): 60–79. Bobik explains that the 1954 article should be seen as "superseding rather than opposing" the 1953 article (60n1). The original French article grew out of Bobik's masters thesis; the later English article grew out of his doctoral dissertation. "St. Thomas on the Individuation of Bodily Substances," (PhD diss., University of Notre Dame, 1953).

Joseph Owens develops this mistaken assumption by insisting on a distinction in individuation between a real or actual order (the viewpoint of being) and a logical or notional order (the viewpoint of notion or consideration). He does not clarify in this context what he means by these viewpoints. Based on other writings, I take it Owens means that the viewpoint of being is the knowledge achieved through judgment of a thing based on its actual existence, that is, based on whether it really is the case (*an est*); and the viewpoint of notion or consideration is the knowledge through a simple grasp or projection of a concept based on its essence, that is, based on what something is (*quid est*) regardless of whether it actually exists.[15] "Concepts express only natures," but judgment expresses "the being that always accompanies the nature."[16] Owens thinks that from the viewpoint of being, existence (*esse*) comes first, then substance along with form and matter, and then accidents including quantity.[17] He thinks that existence (*esse*) provides an explanation of individuation in this mind-independent or "real order" because of its priority from the viewpoint of being.[18] By contrast, for Owens, quantity is last from the viewpoint of being and first only from the viewpoint of notion or consideration.[19] The priority of dimensions in notion is linked to the "priority in being that substance necessarily has over accidents."[20] Dimensions serve as a primary principle of individuation only within our understanding of the notion (*ratio*) of individuation because dimensions, by their very notion, imply spread-out-ness or extendedness, which is a defining feature of division from others, and hence of individuality. According to Owens, Thomas turns to quantity to answer the problem of individuation from "the viewpoint of notion," and so distinct considerations of dimensions answer this problem with more or less precision: indeterminate dimensions are a *generic* determination of quantity; determinate dimensions are a *specific* determination of quantity.[21] Both accordingly answer the problem of individuation with different levels of abstraction. Though Owens quietly notes that Bobik's approach in the earlier (1953) article is "correct" and "very helpful," he claims that abstraction must be invoked to explain the individuating role of dimensions.[22]

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[14] "To say that dimensions *qua* terminated cannot contribute to individuation is not one with saying that terminated dimensions cannot contribute to individuation. The fact is that only terminated dimensions exist. Clearly, then, only terminated dimensions contribute to individuation." Bobik, "Dimensions in the Individuation of Bodily Substances," 69. Wippel mistakenly conjectures that Thomas abandons indeterminate dimensions for similar reasons: "It may also be that, because he realized that dimensions never actually exist in a given material entity without being determined, he concluded that it was not helpful to fall back upon them considered as indeterminate." *Metaphysical Thought of Thomas Aquinas*, 372.

[15] Joseph Owens, "Aquinas on Knowing Existence," *The Review of Metaphysics* 29 (1976): 670–90, esp. 674–8; *An Elementary Christian Metaphysics* (Houston, TX: Center for Thomistic Studies, 1985), ch. 3; *Cognition: An Epistemological Inquiry* (Houston: Center for Thomistic Studies, 1992), 48. Owens follows Etienne Gilson, who rightly stresses the role judgment plays in one's discovery of being as existing. See Gilson's *Being and Some Philosophers*, 2nd ed. (Toronto: Pontifical Institute of Mediaeval Studies, 1952), ch. VI. For some texts about the twofold operation of the intellect and the principle of *esse*, see *In I Sent.* d. 19, q. 5, a. 1, ad 7; *In I Sent.* d. 38, q. 1, a. 3c; *De Trinitate* q. 5, a. 3.

[16] Joseph Owens, "Natures and Conceptualization," *The New Scholasticism* 56 (1982): 376–80, esp. 377.

[17] Owens, "Thomas Aquinas," 186.

[18] Owens mysteriously links the individuating role of existence in the order of being to the grasp of existence in the human intellect. He holds that the human mode of directly grasping

An adequate rebuttal of the view given by Owens would require a separate discussion, which cannot be given in this space,[23] yet I should point out some overall problems with his alternative account. One major if not fatal flaw is that Thomas never states or implies that existence is a principle of individuation. Owens's principal text for support simply maintains that anything that exists is also individual: "the act of existing (*esse*) and individuation of a thing are always

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existence through "a synthesizing act of judgment" points to the synthesizing role that existence plays in the order of being, "forging all the varied elements of the thing into a unit." Owens, "Thomas Aquinas," 174.

[19] "A reverse order holds in our understanding of the notion (*ratio*) of individuation." Ibid., 186.

[20] Owens, "Dimensive Quantity," 284.

[21] Ibid., 302–3.

[22] Ibid., 298n34; "Thomas Aquinas," 183–8. In particular, Owens recalls "non-precisive abstraction" (as opposed to precisive abstraction) presumably because in non-precisive abstraction nothing in the individual is being positively excluded from the nature. Non-precisive or basic abstraction is "the abstraction of an intelligible whole that is identical with each individual in turn. One sees that Socrates is a man, Napoleon is a man, Wyeth is a man. In each instance, 'man' is identified with each individual." Owens, *Cognition*, 145. See also *An Elementary Christian Metaphysics*, 63. As I shall argue, the common nature for Thomas, whether obtained through non-precisive abstraction (e.g., man) or through precisive abstraction (e.g., humanity), requires an identical principle of individuation: matter under determinate dimensions. The type of abstraction only requires a change in the mode of signification (i.e., *per modum totius*, *per modum partis*), not a change in the principle of individuation. For Thomas on different abstractions of the common nature, see *In I Sent.* d. 23, q. 1, a. 1; *ScG* IV, 81, no. 10.

[23] For criticisms of Owens's view, see the references in note 9 above.

found together."[24] As scholars have already noted, Owens's interpretation ignores the context of this statement. Another major flaw is that Owens's interpretation undermines the fact that Thomas repeats throughout his career that matter under dimensions is the principle of individuation. In effect, Owens thinks that Thomas's recurring answer to the problem of individuation does not primarily belong to the "real" or entitative order. The impression we get from Owens is that Thomas's authentic metaphysics of individuation is hermetically sealed by Aristotle's essentialism, in which we find "the drab and uninspiring region of the quantitative."[25] Last, I would argue that Owens systematically misunderstands Thomas's proper methodology. He sidelines Thomas's own metaphysical approach to the problem of individuation, namely, the mode of resolution according to nature and notion (*secundum rationem*).[26] Owens underappreciates that *ratio* (nature and notion) is the analytically discovered aspect of a thing's intrinsic causes, that is, its formal and material causes. Intrinsic causes belong to the "real" or entitative order: the *ratio* of *x* constitutes the being of *x*. The *ratio* of a cat is what constitutes the being of the cat, that is, it constitutes what is proper to the cat as such.

As we shall see below, the solution to the problem of individuation in Thomas's metaphysics takes place within a potency-act analysis of the *ratio* of an individual entity. And Thomas's analysis shows that the primary and necessary conditions for any individual corporeal substance are matter and dimensions:

> Two factors belong to the nature (*ratione*) of an individual: namely, that it be an actual being either in itself or in something else; and that it be

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[24] *QDdA* a. 1 ad 2: "unumquodque secundum idem habet esse et indiuiduationem" (Leonine ed., 24/1.10:350–1). Trans. John Patrick Rowan (St. Louis: B. Herder Book Co., 1949). The context here is about universals not existing in *rerum natura*. Thomas wants "to emphasize that existence and individuality are inseparable components of existing things, and that, consequently, where one is found the other must also be, since nothing can exist save through *esse*, the act of being itself." Reichmann, "Scotus and *Haecceitas*, Aquinas and *Esse*," 72. Also, Dewan, "The Individual as a Mode of Being," 236.

[25] Owens, "Thomas Aquinas," 188.

[26] Joseph Owens, "A Note on the Approach to Thomistic Metaphysics," *New Scholasticism* 28 (1954): 454–76; "The Analytics and Thomistic Metaphysical Procedure," *Mediaeval Studies* 26 (1964): 83–108. For Thomas's exposition on method, see *De Trinitate* q. 6, a. 1; also *ST* I, q. 44, a. 2; *De potentia*, q. 3, a. 5; *De substantiis separatis*, c. 9. For helpful commentary, see Jan Aertsen, "Method and Metaphysics: The *via resolutionis* in Thomas Aquinas," *New Scholasticism* 63 (1989): 405–18; *Nature and Creature: Thomas Aquinas's Way of Thought* (Leiden: Brill, 1988). For a related debate on the merits of "conceptual analysis" as a method in metaphysics, see Joseph Owens, "St. Thomas and Elucidation," *New Scholasticism* 35 (1961): 421–44; Joseph Bobik, "Some Remarks on Fr. Owens' 'St. Thomas and Elucidation,'" *New Scholasticism* 37 (1963): 59–63; Joseph Owens, "Elucidation and Causal Knowledge," *New Scholasticism* 37 (1963): 64–70; Joseph Bobik, "Some Disputable Points Apropos of St. Thomas and Metaphysics," *New Scholasticism* 37 (1963): 411–30.

> divided from other things that are or can be in the same species, while being undivided in itself. And therefore the first principle of individuation is matter, by which the individual acquires actual being for every such form, whether substantial or accidental form. And the secondary principle of individuation is dimension (*dimensio*), because from it matter has the capacity to be divided.[27]

The *ratio* of the individual implies both an actual being and its potential division from others. Form gives actuality to matter, and matter ultimately enables this actual being to exist. Matter moreover is disposed to being spread out or parcelled. Dimensions (dimensive quantity) are the first disposition of matter; they immediately exist or inhere in matter. And quantity by definition means that which is divisible into constituent parts. By their very extendedness, the individual parts of dimensive quantity are situated outside each other, so it is through dimensive quantity that matter is rendered divisible. Dimensions include this division through itself (*per se*).[28] The dimensions extend or spread out the matter to enable the being of individuals.

Thomas states hundreds of times that matter individuates, and he often elaborates by stating that the principle of individuation is individual, particular, or designated matter (*materia signata*).[29] The word *signata* is the past participle of *signare*, which means to mark, stamp, or sign. "Designated matter" means matter signed, distinguished, or determined to the here and now. As we will see, the counterparts to designated matter for Thomas are prime matter and common matter, neither of which is signed, distinguished, or determined to the here and now. One may describe designated matter as matter "considered together with its dimensions."[30] The reason is that matter, according to Thomas, is only designated by dimensions.[31] Different species or subspecies have by nature a dimensive quantity within certain limits: Pomeranians and Bloodhounds, for example, have different maximum dimensive quantities.[32] In any given corporeal individual, determinate dimensions are its dimensions with complete existence (*esse completum*), definitively spread-out or extended through the substantial form. By contrast, indeterminate dimensions are dimensions with incomplete existence (*esse incompletum*), the undefined nature of dimensions preunderstood prior to the substantial form. For example, an individual dog's determinate dimensions may be 0.1 mm as a zygote but two feet as an adult, whereas its indeterminate dimensions include this entire range.[33]

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[27] *In IV Sent.* d. 12, q. 1, a. 1, qc. 3 ad 3 (Mandonnet ed., 4.503). All translations from Thomas Aquinas are my own, unless noted otherwise.

[28] *ST* I, q. 3, a. 2 s.c.; *ST* III, q. 77, a. 2; *In V Meta*. lect. 15, no. 977; *In VII Meta*. lect. 2, no. 1283.

[29] For example, *De ente et essentia* c. 1; *DV* q. 2, a. 6 ad 1; *ScG* I, 65, no. 3; *In I Meta*. lect. 10, no. 154; *In VII Meta*. lect. 15, no. 1626; *ST* I, q. 75, a. 4; *ST* I, q. 85, a. 1 ad 2; *ST* I, q. 119, a. 1. "Individual," "determinate," and "designated" matter signify the same notion.

[30] Bernard Wuellner, *Dictionary of Scholastic Philosophy* (Fitzwilliam, New Hampshire: Loreto Publications, 2012), 73.

[31] Dimensions or dimensive quantity belong to a species of continuous quantity consisting in the length, width, and depth (or density) of a corporeal individual. For an insightful Aristotelian account of the individuating character of dimensive quantity, see Payne, "Gracia and Aquinas on the Principle of Individuation," 545–75.

[32] *In V Meta*. lect. 18, no. 1037; *In I Phys*. lect. 9, no. 65.

I argue that Thomas's reliance on distinct types of dimensions does not indicate a shift of positions because alternate types of dimensions belong to distinct individuating orders. Thomas rarely gives a methodology in his summas, commentaries, or disputations, but we can discern his approach based on the content and context of his answers. In the case of the individuation of corporeal substances, designated matter remains a constant principle of individuation, and the source for the individuation of the matter depends on context. Thomas provides distinct principles of individuation because different items are individuated, that is, distinct individuators belong to distinct "individuends." The contextual key here is that Thomas follows Avicenna in distinguishing two senses of the notion of form.[34] There is the form of the whole (*forma totius*) and the form of the part (*forma partis*). Each requires distinct individuators because the matter belonging to each, whether as a part of the *forma totius* (i.e., common matter) or as a co-principle to the *forma partis* (i.e., prime matter), requires a distinct explanation for its designation. So there are for Thomas two sequences of principles involved in individuation: 1) form of the whole (i.e., essence), common matter, and determinate dimensions; 2) form of the part (i.e., substantial form), prime matter, and indeterminate dimensions.

These two sequences are related according to act and potency. That being is divided into potency and act is well known.[35] What is less known is that potency and act are reciprocally related according to priority and posteriority.[36] Act is prior to potency according to intelligibility (*ratione*) because potency is defined according to its act (e.g., the visible is what can be seen). Act is also prior to potency according to substance (*substantia*) because potency exists for the sake of actuality (e.g., animals have the power of sight in order to see) and also because the form or essence is the perfection or endpoint of generation (e.g., a man comes from a boy). Act is also prior to potency according to time (*tempore*) in a certain sense because some "agent" within the same species precedes in time another in the species (e.g., dogs beget dogs) and also because what exists potentially must always be brought to actuality by an agent (e.g., one learns to play the harp from a harpist). But there is an exception to the priority of act according to time: the individual in time is potential before it is actual (*Metaphysics* 9.8.1049b19). "In numerically one and the same thing," Thomas explains, "what is potential is prior in time to what is actual."[37] For example, the individual seed is prior to the individual corn husk, and the purblind newborn pup is prior to the grown pup that sees.

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[33] *In IV Sent*. d. 11, q. 1 a. 1, qc. 3 ad 4. For complete being (*esse completum*) and incomplete being (*esse incompletum*), *De principiis naturae*, c. 1.

[34] Avicenna, *The Metaphysics of The Healing*, ed. and trans. Michael E. Marmura (Provo, UT: Brigham Young University Press, 2005), IV.3.15–6.

[35] For some texts in Aristotle's corpus on the division of being into potency-act, *Metaphysics* 5.7.1017a36 and 9.1.1045b34.

[36] For the account of potency and act according to priority and posteriority, *In IX Meta*., lect. 7 & 8.

Remarkably, Thomas explicitly maintains two reciprocal orders of nature when considering the universal *as individuated*.[38] He analyzes the way in which a universal is considered with respect to the nature itself (e.g., animal-ness or human-ness) as individuated, that is, as it is found in the particulars. He calls the order by which act is prior to potency, "the order of perfection." The order of perfection is the sequence by which principles of the individual are considered according to their positive or completed state, that is, according to the two firmest modes of being: substance and accident.[39] Thomas also calls the order of perfection, "the order of nature's intention," because nature "intends" or is directed toward the perfection or completion of things. In the order of perfection, act precedes potency, form precedes matter, the whole precedes the part, the less general precedes the more general, and the perfect precedes the imperfect. For example, man is prior in nature to animal because nature's intention does not stop at the animal but aims at generating the man. In contrast, Thomas calls the order by which potency is prior to act, "the order of generation and of time." The order of generation is the sequence by which principles of the individual are considered according to their privative or incomplete states, that is, according to the two weakest modes of being: privation and motion.[40] "Generation is strictly speaking the way to being (*via in esse*)."[41] In the order of generation, potency precedes act, matter precedes form, the part precedes the whole, the more general precedes the less general, and the imperfect precedes the perfect.[42] For example, animal is prior to man because in order to produce a man nature must “first” generate an animal, that is, the human nature determines or builds upon the animal nature.[43] In an analytical snapshot, Thomas’s metaphysics observes simultaneous and reciprocal orders within the individual thing (the *concreatum*). The order of potency and act is reversed when we consider—in numerically one and the same thing—the orders of perfection and of generation.[44] Thomas even argues for the priority of act in the individual within the order of perfection based on the posteriority of act in the individual within the order of generation.[45]

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[37] *In IX Meta.*, lect. 7, no. 1847: "idem numero est prius tempore in potentia quam in actu" (Marietti, 18.444). Trans. John P. Rowan (Notre Dame, IN: Dumb Ox Books, 1995).

[38] *ST* I, q. 85, a. 3 ad 1.

[39] *In IV Meta.* lect. 1, no. 540.

[40] Ibid.

[41] *ScG* I, 26, no. 6: "Generatio, per se loquendo, est via in esse" (Leonine ed., 13.82); *ST* I, q. 90, a. 2; *ST* I q. 110, a. 2; *In I De generatione*, lect. 9, no. 68. Jan A. Aertsen, *Nature and Creature: Thomas Aquinas's Way of Thought*, trans. Herbert Donald Morton (New York: E. J. Brill, 1987), 94.

[42] Thomas turns to the order of perfection and to the order of generation for different philosophical and theological questions. He relies on the distinction to delineate the priority of the soul's powers (*In I Meta.* lect. 1, no. 9; *QDdA* a. 13 ad 10; *ST* I, q. 77, a. 4; *ST* I, q. 82, a. 3 ad 2;

An *order* is made up of the way in which things are related to a principle.[46] Which order belongs to each sequence of individuating principles? If we compare each item in the sequence, then the order becomes clear. The form of the part (i.e., the substantial form) precedes the form of the whole (i.e., the essence) as “part to whole,” since the essence includes the substantial form. For example, the soul of Socrates is only part of Socrates’s whole flesh-and-blood essence. Likewise, prime matter precedes common matter as “potency to act,” since only common matter includes some determination such as flesh and bones. As we shall see, for Thomas, prime matter is pure potency, but common matter (say) of dogs includes the actuality of flesh-and-bones in general. Finally, indeterminate dimensions precedes determinate dimensions as “the imperfect to the perfect,” since only determinate dimensions have complete existence. Thomas uses the language of “perfect” and “imperfect” to describe, respectively, determinate dimensions and indeterminate dimensions. In a pivotal discussion found in his commentary on *De Trinitate* (q. 4, a. 2), he states that determinate dimensions are located in the genus of quantity as “complete” or “perfect” beings (*ut entia perfecta*), whereas indeterminate dimensions are located in the genus of quantity as “incomplete”

ST I, q. 83, a. 2 ad 3), heaven and earth in creation (*In II Sent.* d. 1, q. 1, a. 6 ad 6), the grace and illumination of angels (*In II Sent.* d. 4, q. 1, a. 3 ad 1; *De veritate* q. 9, a. 3, ad 6; *ST* I-II, q. 50 a. 2 ad 3), goodness or malice in the will (*ST* I-II, q. 20, a. 1 ad 3), precepts versus counsels (*QQ* V, q. 10, a. 1), love and desire to pleasure (*ST* I-II, q. 34 a. 4 ad 1), and the theological virtues (*ST* I-II, q. 62, a. 4; *ST* II-II, q. 17, a. 8). For just a few more cases, see *In III Sent.* d. 27, q. 1, a. 4 ad 2; *In IV Sent.* d. 2, q. 1, a. 3; *In IV Sent.* d. 44, q. 1, a. 2, qc. 3 ad 3; *ScG* II, 71; *ST* I, q. 71 ad 5; *ST* I-II q. 20 a. 1 ad 3. For discussion on the order of generation, see Oliva Blanchette, *The Perfection of the Universe According to Aquinas: A Teleological Cosmology* (University Park, PA: Pennsylvania State University Press, 1992), 237–66.

[43] Aristotle, *Generation of Animals* (2.3.736b1–5). *ST* I, q. 85, a. 3 ad 1; *QQ* VIII q. 1, a. 2 (ad 1).

[44] *In II Peri hermeneias* lect. 12, no. 9.

[45] *In IX Meta.* lect. 8, no. 1856: “Cum igitur in eodem secundum numerum actus generatione et tempore sit posterior potentia, ut ex superioribus patet, sequitur quod actus sit prior potentia substantia et ratione” (Marietti ed., 18.447).

[46] *In I Sent.* d. 20, q. 1, a. 3, qc 2; *ST* I, q. 42, a. 3.

or "imperfect" (*ut imperfectum*).[47] Determinate dimensions have complete or perfect existence, whether in the thing or in the soul's cognition, because the dimensions flow or result from (as a proper accident) the union of the matter-form composite. In contrast, the existence of indeterminate dimensions is, so to speak, in development or in-process. Indeterminate dimensions do not have that complete or perfected existence because those dimensions predispose (or are preunderstood in) the matter prior to its union with the substantial form; indeterminate dimensions prior to the matter-form union are not-yet-existing. Thomas analyzes in the order of generation the individual's indeterminate dimensions, not as though they mind-independently existed prior in time, but in the sense that indeterminate dimensions are in-the-process or on-the-move (*in movendo*) toward determination. Indeterminate dimensions only "exist" as building-a-house exists, that is, in a dynamic and inchoate state of imperfect actuality.[48]

In sum, the first individuating sequence of essence, common matter, and determinate dimensions serves within the order of perfection (from the viewpoint of act). These principles help to explain the individual in its realized conditions of substantial and accidental principles as given and perfected or complete (e.g., enjoying a house; understanding grammar; gazing at a statue). The second individuating sequence of substantial form, prime matter, and indeterminate dimensions serves within the order of generation (from the viewpoint of potency). These principles help to explain the individual in its dynamic condition with the substantial or accidental principles as ongoing or in-process and incomplete (e.g., building a house; learning grammar; molding a statue). The distinction between the order of perfection and the order of generation tracks the distinction in Aristotle between actuality (*energeia*) and motion (*kinēsis*).[49] Though Thomas does not explicitly alert his readers to these two orders when discussing the *principle* of individuation, the content and context of his approach make it clear that he does not change his mind on individuation. Designated matter is the principle of individuation of corporeal substances, and the individuation of corporeal substances takes place within a twofold approach: determinate dimensions individuate common matter within the order of *perfection*, and indeterminate dimensions individuate prime matter within the order of *generation*.

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[47] *De Trinitate* q. 4, a. 2 (Leonine ed., 50.125:214–37). I will discuss this text in section 3 below.

[48] For motion as an imperfect actuality and something indeterminate (*indeterminata*), see *In Meta*. XI, lect. 9.

[49] See Aristotle, *Metaphysics* 8.6.1048b18–35; *Nicomachean Ethics* 10.4. *Energeia* includes in itself the end or goal; *kinēsis* does not include in itself the end or goal. In speech, the use of the perfect tense serves to indicate this distinction. For example, seeing includes in itself the end of seeing (e.g., "I have seen the horizon"), but building does not include the end of building (e.g., "I have not yet built the building"). For discussion, J. L. Ackrill, "Aristotle's Distinction between *Energeia* and *Kinēsis*," in *Essays on Plato and Aristotle* (Toronto: Oxford University Press, 1997), 142–62.

Individuation within the order of perfection proceeds according to the actuality of the individual's principles, that is, according to their complete existence. We consider the individual's principles in their perfected state, and we ask for the "whence" of their individuality. Thomas employs determinate dimensions to resolve a series of distinct philosophical problems that perhaps may not be typically identified with *the* problem of individuation.[50] But individuation is no monolithic issue for Thomas. Context shows that his view of the principle of individuation according to the order of perfection applies to a number of issues, all of which presume the intention of nature, that is, the finality or perfected state of the order of nature. Some questions pertaining to *universals* consider the generic nature or specific nature and their instantiation (e.g., "how does the specific human nature contract to Socrates's individual nature?"). Some questions pertaining to *cognition* consider the intellectual grasp of singulars (e.g., "how do I know Socrates's individual nature, since my intellect only directly grasps specific human nature?"). And some questions pertaining to *science* consider the scientific grasp of singulars (e.g., "how would Socrates be defined if Socrates could be defined?").[51] Each of these questions presuppose the "already" complete existence and full intelligibility of the individual and investigates the source for its individuality.

I shall first discuss the problem of individuation within the order of perfection. Within the order of perfection, determinate dimensions serve to individuate common matter, included in the common nature. All three contexts (concerning universals, cognition, and science) ask for some static principle that determines common matter. And determinate dimensions fulfill this condition because they have complete existence. Only something whose dimensions are complete can answer questions about the full intelligibility of the individual (II). I shall then turn to discuss the aspect of individuation concerning the order of generation. The topic of individuation in the order of generation seems more straightforward. Individuation within the order of generation proceeds according to the potentiality of the individual's principles, that is, according to their incomplete existence. Within the order of generation, indeterminate dimensions serve to individuate prime matter, co-principle to the substantial form. This line of inquiry asks for a dynamic principle that determines prime matter. And indeterminate dimensions answers this question because they predispose prime matter for the substantial form. I also touch on the natural philosophy at work in the order of generation and resolve the seemingly contradictory statements against determinate dimensions (III). I shall conclude by considering the import of Thomas's later abandonment of the controversial Averroist phrase, "indeterminate dimensions," and argue that Thomas continues to maintain the notion of indeterminate dimensions into his later writings (IV).

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[50] Bobik's (1953) French article goes too far in insisting that, even though determinate dimensions resolve a problem of individuation, Thomas's "primary intention" is not to answer the problem of individuation. Bobik, "La doctrine de saint Thomas sur l'individuation des substances corporelles," 34.

[51] These terms (universals, cognition, science) that describe issues that belong to the order of perfection are my own, but each summarizes in a word the contexts of the passages where Thomas discusses individuation according to determinate dimensions.

II. The Order of Perfection and Determinate Dimensions

For Thomas's treatment of individuation in the order of perfection, context reveals three related questions about individuation pertaining to universals, cognition, and science. All three questions share the same distinctly metaphysical problem regarding how a generic or specific nature is rendered individual. Contrary to our current sensibilities, Thomas does not view the individual as most perfect.[52] "Every agent chiefly intends in his work that which is most perfect; but the nature of the species is the most perfect (*perfectissimum*) in each and every individual."[53] Nature intends to produce its like, which is the specific nature, and the way to achieve this reproduction in matter-form composites is to produce the individual. What is first in the order of intention is last in the order of execution. For example, although the surgeon's intention is to produce health, the surgeon first has to cut the patient's tissue.[54] Similarly, although the intention of nature is to produce a nature, nature first has to produce an individual. "There is no *man* prior to *this* man."[55] So the order of perfection considers the individual as "already made" because the individual is a necessary condition in order to have the nature of the species. In the order of perfection, the metaphysician considers the individual with its substantial principles as finished. The intelligibility of the individual is in full consideration, including all of its proper parts: Fido has organs and abilities proper to the canine nature with features distinguishing him from a wolf. But the canine nature is not the reason for Fido's incommunicable (i.e., unable to be shared) canine nature; nor is the canine nature the reason why Fido is distinct from his twin, though both share the same specific and sub-specific nature. Incommunicability and distinction are among the many intensions of individuality that Thomas employs in his approach to individuation.[56]

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[52] Individuation in matter-form composites is rather an imperfection. Many interpreters make the mistake of confusing numerical unity in composites (an imperfection) with transcendental unity (a perfection). For an exception, see George P. Klubertanz, "St. Thomas and the Knowledge of the Singular," *New Scholasticism* 26 (1952): 135–66, esp. 165n101.

[53] *QQ* 8.2: "Agens autem quilibet precipue intendit in opere id quod perfectius est; natura autem speciei est perfectissimum in unoquoque indiuiduo," (Leonine ed., 25.54:50–52). The line of reasoning here is that nature does not principally intend to generate Socrates because otherwise, when Socrates is destroyed, the order and intention of nature would be ruined. Thomas refers to Avicenna's Physics of the *Shifa* 1.1 which states, "Ergo hoc intendunt ut naturae specialum faciant esse aliqua individua in sensibilibus, non autem intenditur hoc individuum expresse signatum, sed in natura particulari quae propria est ipsi individuo quia, si intenderent hoc individuum expressum, destruetur esse et ordo eius quando destrueretur individuum vel quando desineret esse" (*Avicenna Latinus*, *Liber primus naturalium: Tractatus primus de causis et principiis naturalium*, ed. S. Van Riet (Leiden: Brill, 1992), pp. 8–9.59–66).

[54] *In VII Meta*. lect. 6, no. 1411.

[55] *QQ* 8.2: "non autem prius est homo quam hic homo," (Leonine ed., 25.54:70). Italics mine. The individual is first in the order of execution, but it is last in the order of intention.

The most familiar question about individuation in the order of perfection asks about universals. Universality directly concerns the common nature, such as the specific nature (*ratio speciei*, *natura speciei*) and the generic nature (*ratio generis*, *natura generis*), including the matter of the common nature, which is common matter.[57] So the question is, what individuates common matter? One objection states that it is not possible for a person to take on two natures of the same species because a common nature (e.g., a specific nature) cannot be "multiplied" except according to a plurality of supposits. Since a single person is only one supposit, a single person cannot have two specific natures, according to the objection.[58] In response, Thomas explains what principle would necessarily imply a plurality within a common nature. He states that the question of individuating and dividing a common nature finds its resolution in the same principle. The principle of individuation is matter considered in some way under determinate dimensions. The principle of dividing human nature (division) is the same as the principle multiplying human nature (numerical distinction): human nature is divided and multiplied from the consideration of matter under determinate dimensions. Having two bodies and two souls is a necessary and sufficient condition for having two natures because the distinction of two bodies implies numerically distinct considerations of matter under determinate dimensions.[59] The precise question here is whether one person can take on two human natures. Thomas states that one can rationally hold that a person could take on two human natures. It is not contrary to the notion of a person to do so. He concludes that if the divine person were to assume two bodies and two souls, then the divine person would have assumed two human natures. Common nature includes common matter, and individual nature includes matter under determinate dimensions. Matter under determinate dimensions serves as a principle of individuation because it "divides" or "multiplies" the common nature. It renders the nature of an individual distinct from the nature of the species and from others in the same species.[60]

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[56] For five intensions of individuality, all of which Thomas relies upon to some extent in both the orders of perfection and of generation, see Jorge J. E. Gracia, *Introduction to the Problem of Individuation in the Early Middle Ages* (Washington, D.C.: The Catholic University of America Press, 1984), 22–31.

[57] I set aside here an account of the common nature. Briefly, I would argue that common nature is a universal and mind-dependent nature. The mind abstracts a nature from individuating conditions, and it also adds an intention of universality to the nature. For some texts that delineate universals, see *De potentia* q. 5, a. 9 ad 16; *QQ* VIII q. 1, a. 1.

[58] *In III Sent.* d. 1, q. 2 a. 5 arg. 1 (Mandonnet ed., 3.43). Thomas does not discuss individuation of matter-form composites in terms of the supposit (i.e., the individual existing subject, or the individual subsisting subject). The reason may be that the hylomorphic supposit as such does not require individuation. For Thomas, the problem of individuation asks how the nature (or how the principles of nature such as the substantial form) is rendered individual, but the supposit is already by definition an individual substance. Whereas the nature (and its principles) are individuated, the individual subsisting nature (i.e., the supposit) is the achievement of the fusion of the individuated nature and its act of being (*esse*). The supposit has a nature, which is individuated, but the supposit itself is not individuated. The supposit only presupposes individuation. *De potentia* q. 2, a. 1 ad 2; *In V Meta.* lect. 10, no. 904; *QQ* q. 2, a. 2. For discussion on the supposit, see Wippel, *Metaphysical Thought of Thomas Aquinas*, 238–52; Bobik, "St. Thomas on the Individuation of Bodily Substances," 102.

Within this individuating order of perfection, questions about cognition and science are much less familiar. For example, the question about individuation in cognition within the order of perfection is not the same as the related problem of discernibility. Jorge Gracia helpfully distinguishes between the medieval "ontological" problem of individuation and the contemporary "epistemic" problem of discernibility. He states that the medievals primarily consider individuation in "ontological" terms.[61] I would clarify that, although the medieval problem of individuation is not a problem of discernibility, there is nevertheless an "epistemic" problem of individuals among late medievals and their followers.[62] This peculiar "epistemic" problem asks about the metaphysical conditions for the possibility of apprehending singulars: one grasps the singular through the principle that individuates the nature. Thomas explicitly distinguishes between the principle of individuation and the principle of discernibility: accidents besides dimensions are not the principle of individuation, he states, but are rather "the principle of cognizing a distinction between individuals."[63] For example, spatial differences (*diversitas in loco*) and temporal differences (*diversitas temporis*) are not principles of individuation but are more like "signs" of the individual. Spatio-temporal accidents serve as principles of discernibility but not as principles of individuation, not even with regard to cognition. According to Thomas, accidents that inhere mediately in dimensions such as common sensibles (of number, shape, motion, and rest) render the particular discernible.[64] Principles for discerning Socrates at Cephalus's house depend upon and reduce to the principle of individuation. By contrast, the cognitive question of the topic of individuation within the order of perfection looks for the ultimate or root principle in identifying Socrates's individuality.

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[59] *In III Sent.* d. 1, q. 2, a. 5 ad 1 (Mandonnet ed., 3.45).

[60] For some other writings on the "universal" aspect to the problem of individuation in the order of perfection, *QQ* II, q. 2, a. 2; *ScG* I, 21, no. 4; *ScG* I, 65, no. 3; *In VII Meta.* lect. 11, no. 1521; *ST* I-II, q. 10 a. 1 ad 3.

[61] "Numerical Continuity in Material Substances," 75; *Introduction to the Problem of Individuation*, 270–2; *Individuation in Scholasticism*, 16.

[62] For texts and discussion, see Klubertanz, "St. Thomas and the Knowledge of the Singular," 135–66. Following Thomas, Klubertanz discusses singular cognition in terms of individuation. For the wider scholastic context, see Camille Bérubé, *La connaissance de l'individuel au moyen age* (Montréal: Presses de l'Université, 1964).

Principles of discernibility habitually take precedence within cognitive and scientific fields because both plain knowers (e.g., Jack and Jill) and special scientists (e.g., zoologists) operate on a pre-philosophical level. They discern everyday characteristics of their object with immediacy. I recognize my cat outside my door by distinguishing her raspy mew and brindled coat. If one of these qualities alters, then I suspect another cat. These principles of discernibility let the plain knower and special scientist distinguish one numerical thing from another, but they are not arrived at through a resolution of the many features of a given individual. They are not the ultimate principles of the individual. Metaphysics or first philosophy is concerned with the individual because the individual is a property of being as being, so this common science or "metascience" analytically resolves the many factors of each individual into first principles. Thomas's metaphysical answer to the principle of individuation of the cognized singular is matter under determinate dimensions because determinate dimensions provide the distinct character of individuality placing "parts outside of parts," that is, spreading out or extending parts of a body (e.g., a strand of hair) apart from other parts of the body (e.g., another strand of hair), preventing two bodies from being in the same place.

Within the order of perfection, to answer questions about individuation regarding cognition, Thomas turns to matter under determinate dimensions because only determinate dimensions are intentionally or cognitionally existing dimensions (i.e., dimensions grasped by the cognitive powers of sense or intellect), and intentionally existing dimensions notify or inform the individual nature as such, that is, the re-presentative or informational "content" of the individual, such as this snub nose. For Thomas, the abstractive nature of the human mind problematically prevents a direct, that is, unmediated knowledge of the singular, because the mind is an immaterial power of the soul and the principle of individuation is material. The human mind only knows matter through form, but since its direct grasp of forms is merely common or universal, its grasp of forms does not relay the material content that belongs to singulars. In this context, Thomas is referring to the form of the whole (*forma totius*) or nature, that is, the quiddity or essence of a thing. The *forma totius* of compound substances includes common matter in its notion (intelligible structure): the form of the whole cat includes the notion of flesh and blood.[65] The intellect only directly grasps flesh and blood, not *this* flesh and *this* blood. Though the senses make direct contact with material singulars, the human intellect naturally knows things (besides itself) through the operation of abstraction, leaving individuals behind so to speak. This natural mode of human cognition explains why "universals are better known than particulars."[66]

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[63] See *De Trinitate* q. 4, a. 2: "Alia uero accidentia non sunt principium indiuiduationis, set sunt principium cognoscendi distinctionem indiuiduorum (Leonine ed., 50.125:243–6). see also *De Trinitate* q. 4, a. 4 ad s.c. 1, 2 & 3; Wippel, *Metaphysical Thought of Thomas Aquinas*, 362–3. One finds a contemporary application of this discernability in the use of behavioral biometrics, which can identify an individual's unique motion fingerprint by detecting someone's gait.

[64] The form of motion in someone's gait helps us to discern a unique individual, but the form of motion is not a sufficient reason for the individual's mode of being in the soul. Socrates's walk awakens the senses to Socrates as distinct from other things, and it serves to separate him from a crowd. But his walk is not the formal reason for Socrates's cognitional existence (in the soul).

De veritate (q. 10, a. 5) resolves this metaphysical conundrum about the cognitional being of singulars. The intellect distinguishes or qualitatively determines its common matter as this individual matter (belonging to Socrates) through a turning or bending (*reflexio*) to the sense-powers in which there are determinate dimensions. The intellect directly apprehends the essence or quiddity of flesh, for example, but it (only indirectly) apprehends by reflexion the flesh itself.[67] In *De veritate*, Thomas explains that matter considered as common is not the principle of individuation, but the principle is rather matter as considered in singulars, which is designated matter under determinate, existing dimensions; out of this matter the form of the whole is individuated.[68] In this account, Thomas states that the intellect subsumes its consideration of common matter under the sense-power's grasp of determinate and existing dimensions in order to indirectly know the designated matter of *this* cat. The early *De veritate* is not an isolated instance of this view. Thomas's commentary on Book II of the *De anima*, written between the end of 1267 and the middle of 1268, makes the same point. On the one hand, we attain cognition of universals by abstraction from corporeal matter and individuating material conditions. On the other hand, we attain cognition of singulars (*singularium*) by the individuation of the common nature from "corporeal matter contained under determinate dimensions" (*sub determinatis dimensionibus contenta*).[69]

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[65] The "form" here cannot be the substantial form, the form of the part (*forma partis*) correlative to prime matter, because the intellect directly grasps a form that includes matter as well. And the substantial form (e.g., the soul) does not include its co-principle (e.g., the body). For discussion, see Edwards, "The Realism of Aquinas," 98; Wippel, *Metaphysical Thought of Thomas Aquinas*, 328. This distinction between *forma totius* and *forma partis* is often glossed over by interpreters. For example, Robert Pasnau and Christopher Shields correctly point out that matter is the principle of individuation "not for the substance as a whole but for the form," but they do not clarify which form. The confusion surfaces when they cite a passage to determinate dimensions (*In V Meta*. lect. 8, no. 876) but then explain the individuation of "a substantial form." See both editions of *The Philosophy of Aquinas* (New York: Oxford University Press, 2016), 74.

[66] *ScG* 3.75 no. 12. Besides the unique case of self-knowledge, human knowing consists of abstracting "universal forms from their particular conditions." *ST* I, q. 79, a. 4. Natures or forms of sensible things are not actually intelligible until the intellect considers (*abstrahit*) the universal apart from the particular, as "man" apart from Socrates and Plato. The universal comes from this abstraction of the form (of the whole) from the particular matter. *In VIII Meta*. lect. 1, no. 1683; *ST* I, q. 79, a. 3; *ST* I, q. 86, a. 1.

[67] *In II Sent*. d. 3, q. 3, a. 3, ad 1: "Intellectual light received in (our human intellect) is not sufficient for determining a proper knowledge of a thing, unless through species received

I have shown how Thomas answers the "whence" of the individual through the same principle of individuation in the context of questions about universals and cognition. Thomas also answers the "whence" of the individual through the same principle in the context of questions about science. If our intellect only directly considers universals, then we cannot directly consider individuals through science, which is an intellectual virtue. Even natural science cannot be based on particulars; it is rather based on universal natures (*rationes universales*), which are "necessary and eternal."[70] The reason why science does not directly consider individuals is that the scientific principle by which the intellect considers an essence is its definition. Since definitions do not include individual matter,

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from things, which must be formally received in it according to its mode; and so from (these intelligible species) singulars are not known, which are individuated through matter, unless by a certain reflexion of the intellect to imagination and to sense, namely when the intellect applies the universal species, which it abstracted from singulars, to the singular form preserved in the imagination" (Mandonnet ed., 2.121–2); see *DV* q. 2, a. 6; *DV* q. 10, a. 5; *QQ* VII, q. 1, a. 3; *In III De anima*, lect. 8, no. 713; *ST* I, q. 86, a. 1; *ST* II-II, q. 47, a. 3 ad 1. Thomas uses "indirectly" and "by reflexion" equivalently in *QQ* XII, q. 8.

[68] *De veritate* q. 10, a. 5: "Sic autem considerata materia non est individuationis principium, sed secundum quod consideratur materia in singulari, quae est materia signata sub determinatis dimensionibus existens: ex hac enim forma individuatur," (Leonine ed., 22/1.309:48–53).

[69] *In II De anima* lect. 12 no. 377. The entire commentary passage is an explanation of "why sensation is of singulars, whereas science is of universals." The contrary to "corporeal matter" is "spiritual matter," which Thomas rejects (*ST* I, q. 75, a. 5 s.c.; *ST* I, q. 90, a. 2; ad 1; *De spiritualibus creaturis* a. 9 ad 9). For a different interpretation of "corporeal matter" in this commentary passage, see Robert Pasnau, "Aquinas and the Content Fallacy," *Modern Schoolman* 75 (1998): 293–314, esp. 298. For other writings in Thomas on the cognitive aspect to the problem of individuation in the order of perfection, *QDdA* a. 4; *QDdA* a. 20; *ScG* II, 82, no. 12; *ScG* II, 100, no. 2; *ST* I, q. 14, a. 11 ad 1; *De substantiis separatis*, ch. 16.

[70] *In VI EN* lect. 3, no. 1146. Also, *ST* I-II, q. 57, a. 2; *ST* I, q. 86, a. 3.

singulars which are made up of individual matter are not defined.[71] Yet metaphysics has to account for the individual essence and so asks how one would define Socrates, if Socrates could be defined. *De ente et essentia* answers this question while discussing the meaning of the word "essence" in compound substances. "Essence" signifies that which is composed of matter and form, but the matter in question is not the principle of individuation.[72] Whereas the definition of the essence of man includes non-designated matter (e.g., bone and flesh), the counterpossible definition of the essence of Socrates would include designated matter, that is, matter considered under determinate dimensions (e.g., *this* bone and *this* flesh).

Definitions of composites include non-designated matter; counterpossible definitions of singulars include designated matter. Figure 1 shows the proportional analogy between 1) the designation of the individual's essence and the species's non-designated essence to 2) the species's designated essence and the genus's non-designated essence. Just as the essence of the individual is designated or determinate in respect to the species, the essence of the species is designated or determinate in respect to the genus.

	Non-Designated	**Designated by**	**Designated Essence**
Definition of a Species	essence of the genus (e.g., animal)	the difference taken from the form (e.g., rational)	essence of the species (e.g., man)
Counter-possible Definition of an Individual	essence of the species (e.g., man)	matter under determinate dimensions (e.g., these bones)	essence of the individual (e.g., Socrates)

Figure 1. Designation of Essences in *DEE*, ch. 2.

The two modes of determination or designation are not entirely the same because "the designation of the individual with respect to the species is through matter with determinate dimensions."[73] We know different types of quiddity or essence through successive qualitative determinations based on either the form (in the case of a species) or the matter under determinate dimensions (in the case of an individual). In our apprehension of compound substances, the quiddity or essence of a genus or species has matter (e.g., flesh), but what determines the essence of the individual is designated matter, that is, matter under determinate dimensions (e.g., *this* flesh).

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[71] *In VII Meta*. lect. 10, no. 1497.

[72] *De ente et essentia* c. 2 (Leonine ed. 43.371:67–84). Designated matter is the principle of individuation, and designated matter is matter considered under determinate dimensions (*determinatis dimensionibus*). This matter is not placed in the definition of man as man, but it would be placed in the counterpossible definition of Socrates. By contrast, non-designated matter is placed in the definition of a specific nature: bone and flesh taken simply (*absolute*) are placed in the definition of man.

[73] *De ente et essentia* c. 2 (Leonine ed. 43.371:92–94). By contrast, the designation of the species with respect to the genus is through the difference taken from the form.

The "scientific" aspect to the problem of individuation within the order of perfection may be more clearly seen in the case of examples within the mathematical and physical sciences.[74] *De veritate* (q. 2, a. 6) asks whether the human intellect knows singulars,[75] but the response to the first objection most interests us. Thomas neatly distinguishes four scientific ways of considering matter. He first distinguishes between (1) intelligible matter and (2) sensible matter. We find intelligible matter (e.g., figure, point, line, and curve) in the nature of a continuum (i.e., what is potentially divided without end).[76] By contrast, we find sensible matter (e.g., flesh, bone, and snub nose) in physical matter.[77] Thomas states that we can further distinguish each of these (1 & 2) considerations of matter into (a) designated (*signata*) and (b) non-designated (*non signata*). Designated matter is matter considered together with the determinate dimensions (*determinatione dimensionum*), that is, with these or those dimensions, and non-designated matter is considered without determinate dimensions. Figure 2 schematizes these distinctions.

	(1) Intelligible Matter	**(2) Sensible Matter**
(a) Designated	with determinate dimensions (e.g., *this* figure, *this* line)	with determinate dimensions (e.g., *this* flesh, *these* bones)
(b) Non-Designated	without determinate dimensions (e.g., figure, line)	without determinate dimensions (e.g., flesh, bones)

Fig. 2. Four Considerations of Matter in *DV* 2.6

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[74] *De Trinitate* q. 5, aa. 2 & 3; *In VII Meta*. lect. 11, no. 1519.

[75] The body response to *De veritate* (q. 2, a. 6) repeats that the human intellect of itself does not know singulars, but that the human intellect nevertheless knows singulars *per accidens*, through a certain reflexion on the phantasm.

[76] These mathematical objects depend on matter for their existence (*secundum esse*) but do not depend on matter for their notion (*secundum rationem*). For descriptions of the continuum, see *In I Phys*. lect. 3, no. 22; *In VI Phys*. lect. 3, no. 775. For discussion on intelligible matter, see Paul O'Reilly, "What is Intelligible Matter," *The Thomist* 52 (1988): 74–90; Wuellner, *Dictionary of Scholastic Philosophy*, 73.

[77] These physical objects depend on matter both for their existence (*secundum esse*) and also for their notion (*secundum rationem*). *De Trinitate* q. 5, a. 3. Aristotle, *Metaphysics* 7.10.1036a9.

De veritate (q. 2, a. 6) is here assuming a type of abstraction that presupposes the natural abstraction of the agent intellect. Even after the "ordinary" abstraction of the agent intellect, the philosophical sciences have to further determine the intelligibility of their concepts. Different sciences must prescind from (i.e., formally exclude from the mind's attention) different principles of individuation.[78] Through a "scientific" abstraction, we sharpen the notion of the already gained quiddity or essence of cat in order to glean an essential definition. On the one hand, the natural philosopher abstracts a whole from the part (i.e., a universal from particulars), as when an anthropologist considers the quiddity of bones apart from whether they belonged to aboriginals or colonists. He abstracts from designated sensible matter (2a) but retains non-designated sensible matter (2b). On the other hand, the mathematician abstracts form from matter (i.e., an accidental form from sensible matter), as when the mathematician abstracts the quiddity of a triangle from the metal triangle or *this* geometrical triangle. He altogether abstracts from sensible matter (2a & 2b), and he abstracts from its designated intelligible matter (1a). But the mathematician retains non-designated intelligible matter (1b).[79] Beyond this consideration of quiddities, science for Thomas *can* indirectly consider singulars by cooperating with the sense powers: we know singular objects through the habit of science as long as they come under the senses or the "imagination" (*phantasiam*).[80] In natural philosophy, we consider singular sensible circles (e.g., wooden circles) when they exist in sensible matter as an object of the proper and common sense-powers; in mathematics, we consider singular mathematical circles (e.g., circles on a plane) when they exist in intelligible matter as an object of the imaginative power.[81]

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[78] This scientific prescision or abstraction presupposes a type of abstraction from material conditions in the phantasm by which the agent intellect generates intelligible species. This "natural" type of abstraction first acquaints us with the quiddity or essence of, say, a cat. For a discussion on multiple types of abstraction in Thomas's writings, see Therese S. Cory, "Rethinking Abstractionism: Aquinas's Intellectual Light and Some Arabic Sources," *Journal of the History of Philosophy* 53 (2015): 607–646, esp. 629–30.

[79] *DV* q. 2, a. 6; *De Trinitate* q. 5, a. 3; *In IV Sent*. d. 12, q. 1, a. 2 qc. 1 ad 2; *In VII Meta*. lect. 10, no. 1496; *ST* I, q. 85, a. 1 ad 2. Thomas's theory of individuation in which designated matter (with determinate dimensions) is the principle of individuation tells us what scientists do study: the natural philosopher directly studies objects that have non-designated sensible matter (2b) and the mathematician directly studies objects that have non-designated intelligible matter (1b).

[80] *De Trinitate* q. 5, a. 2 ad 4.

[81] For example, mathematical singulars are intelligible insofar as they are grasped without the senses by means of "imagination" (*phantasiam*). When they are not actually being perceived through the sense-powers, these (say) sensible circles are known insofar as they are circles, not insofar as they are *these* circles. *In VII Meta*. lect. 10, no. 1495–6; *Metaphysics* 7.11.1036a26; *De Trinitate* q. 5, a. 2 ad 4; see Klubertanz, "St. Thomas and the Knowledge of the Singular," 153. For some background on "imagination" (*phantasiam*), see Deborah Black, "Imagination and Estimation: Arabic Paradigms and Western Transformations," *Topoi* 19 (2000): 59–75, esp. 62–6.

Determinate dimensions play a key role in Thomas's account of individuation in the order of perfection, and its application to the scientific and cognitive aspects of the problem of individuation is especially complex. It is important to remember that the issue of individuation related to questions about cognition and science follow upon the question about universals. In this order of perfection, the principle of individuation in cognition and science is not numerically identical to the principle of individuation in questions concerning universals. "The form by which the stone exists is not in the soul; only its likeness (*similitudo*) is in the soul."[82] The likeness of the known that exists in the knower is only re-presentative of the thing's nature. To recapitulate, then, determinate dimensions are actual and complete dimensions that belong to the common sensible form of magnitude. Determinate dimensions actualize (i.e., make actual) the common and internal sense-powers so as to exist in them intentionally or cognitionally, namely, in this re-presentative way. The proper object of the intellect (i.e., the quiddity of a material thing) includes common matter, but the intellect can turn or bend back to the individual likeness re-presented in the phantasms, which exist in the imaginative, memorative, and cogitative sense-powers.[83] The sensible form of determinate dimensions existing in the sense-powers enables the intellect to indirectly grasp the singular. By turning to the sense-powers, the intellect cooperates with them to compose the quiddity of, say, a cat with the sensible form of *this* cat's determinate dimensions existing in the sense-powers.

How does this "turning" or "bending" take place? Thomas recognizes that the human intellect in its varied operations knows the individual.[84] But he insufficiently explains his metaphor of turning or bending. How exactly does the intellect, and not just the sense, grasp the singular? One challenge facing our interpretation of Thomas's account of individuation so far is that determinate dimensions (existing in the sense powers) cannot directly designate common matter (existing in the intellectual powers), because the corporeal and incorporeal belong to distinct genera or kinds of being. Determinate dimensions fall under the branch of corporeal substances because they are material; common matter falls under the branch of incorporeal substances because it is abstract and so immaterial. So the sole cognitive power with the individual as its essential (*per*

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[82] *DV* q. 8, a. 11 ad 4. Also, *DV* q. 8, a. 9 ad 4; *DV* q. 8, a. 11 ad 3; *DV* q. 10, a. 4; ad 4. Klubertanz, "St. Thomas and the Knowledge of the Singular," 140.

[83] *ScG* II, 73; *ST* I, q. 89, a. 5.

[84] Thomas states that the human intellect forms the proposition, "Socrates is a man," through a cooperation with inner sense-powers, and he holds that practical reason applies universal principles to individual actions (e.g., "I should not here and now eat this slice of cake"). *ST* I, q. 86, a. 1; *ST* II-II, q. 47, a. 3; *In VI Ethica* lect. 7, no. 1215.

se) object is the cogitative (or estimative) sense-power.[85] Partly for these reasons, Thomas states in various ways that the (possible) intellect merely accesses the singular indirectly and incidentally (*per accidens*): "the intellect does not know the singular as it is *this*, but according to some common nature, insofar as it is a man or a white thing or even as a particular thing, not however as it is *this man*, nor as a particular *this*."[86] The human intellect penetrates only "the intimate nature of the species which is in these individuals," not the singular as such.[87] The singular *qua* singular is never intellectually cognized.

This challenge shows that a clarification must be made. My discussion of Thomas's psychology has been in terms of the explanatory model of powers (sense, intellect) and their operations (sensing, thinking), but for Thomas the operations of the cognitive parts belong irreducibly to the whole (man). "Men see through their eyes and touch through their hands."[88] Likewise, it is the whole *man* who sees and thinks of the individual (matter-form) composite through the cognitive powers of sense and intellect: "Man foreknows (*praecognoscit*) singulars through imagination and sense, so he can direct (*applicare*) universal cognition which is in the intellect to the particular. Properly speaking, neither sense nor intellect knows, but rather man knows through both."[89] This holistic framework avoids two mistakes. On the one hand, it avoids reductionism. Thomas does not reduce the human knower to the systems (sense and intellect) and subsystems (e.g., cogitative power) that make up our cognitive apparatus, because it is not the hand or the mind that salutes an officer.[90] It is the human knower who knows the singular (e.g., Socrates): it is a man who knows the singular indirectly through intellection, and it is a man who knows the singular directly through sensation and perception. On the other hand, this holistic framework escapes dualism. Medieval thinkers such as Thomas thought of the human being as "composed of a spiritual and a corporeal substance."[91] This theory of cognition assumes the "psychophysical" nature of human beings, which occupies both the corporeal (material) and incorporeal (immaterial) orders. Thomas's account of human intellectual cognition of singular matter-form composites assumes that the intellectual soul is "as though on the horizon and confines of things corporeal and incorporeal," that is, it belongs analogously to both types of substances.[92] The reason is that the intellectual soul is both an immaterial soul and the form of a body; "it informs matter but is not itself material."[93]

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[85] For texts and discussion on Thomas's account of the cogitative power, see A. Leo White, "Why the Cogitative Power?," *Proceedings of the American Catholic Philosophical Association* 72 (1998): 213–27.

[86] *DV* q. 10, a. 2: "Sicuti enim intellectus non cognoscit singulare ut est hoc sed secundum aliquam communem rationem, ut inquantum est homo vel albus vel etiam particularis, non autem inquantum est hic homo vel particulare hoc, ita etiam intellectus cognoscit praesens et praeteritum, non inquantum est hoc nunc et hoc praeteritum," (Leonine ed., 22/1.300:92–9). See also *DV* q. 2, a. 6; ad 3; *DV* q. 10, a. 5; *In II De Anima* lect. 13, *In VI Ethica* lect. 7.

[87] *DV* q. 10, a. 5 ad 5: "sensus enim cognoscit ea quantum ad dispositiones materiales et accidentia exteriora, sed intellectus penetrat ad intimam naturam speciei quae est in ipsis individuis," (Leonine ed., 22/2.310:130–3). *In V Meta.* lect. 13, no. 947.

[88] *ST* I, q. 75, a. 3 ad 2.

[89] *DV* q. 2, a. 6 ad 3: "Homo praecognoscit singularia per imaginationem et sensum, et ideo potest applicare cognitionem universalem quae est in intellectu ad particulare : non enim proprie loquendo sensus aut intellectus cognoscunt sed homo per utrumque, ut patet in I *De anima*," (Leonine ed., 22.1.66–67:127–133). See also *DV* q. 10, a. 9 ad contra 3; *De spiritualibus creaturis* a. 10 ad 15; *In I De Anima* lect. 10, no. 152; *ST* I, q. 75, a. 2 ad 2; *ST* I, q. 75, a. 4; *ST* II-II, q. 58, a. 2.

[90] This holism applies even to the cognition (after its separation from the body) of the separated soul, which Thomas thinks operates dysfunctionally or abnormally (*praeter rationem*

Based on this holistic framework that Thomas employs, we can conclude from the order of perfection that the intellectual knower is somehow involved in individuation. Regarding questions touching on issues of singular cognition and the intellectual habit of science, the problem of individuation involves an agent of intellectual cognition (i.e., a rational agent, a person). What role does the knower play? Thomas's strategic distinction between intrinsic causes and extrinsic causes is helpful here.[94] On the one hand, *intrinsic* causes consist of formal and material causes, which are its intelligible structure (*secundum rationem*). They are causes present within the thing and jointly constituting it as part of the thing's definition. For example, that the ball is round and dense explains according to intrinsic causes why it moves. The principles of individuation (common matter and determinate dimensions), which Thomas arrives at through potency-act analysis of the individual, are the intrinsic causes. According to my interpretation, common matter is the material cause of individuation (because it is that from which designation occurs), and determinate dimensions are the formal cause of individuation (because it is that through which designation occurs). *This* flesh and

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suae naturae) without its ability to turn toward the phantasms that exist in the bodily organs. *ST* I, q. 89, a. 1.

[91] *ST* I, q. 75, pr.

[92] *ScG* II, 68, no. 6: "quasi quidam *horizon* et *confinium* corporeorum et incorporeorum, inquantum est substantia incorporea, corporis tamen forma" (Leonine ed., 13.441). For discussion and texts about the analogy presupposed here, see Armand Maurer, "St. Thomas and the Analogy of Genus," *New Scholasticism* 29 (1955): 127–44. For discussion on metaphysical vs. logical genera, see Gregory T. Doolan, "Aquinas on Substance as a Metaphysical Genus," in *The Science of Being as Being: Metaphysical Investigations*, ed. G. T. Doolan (Washington, D.C.: The Catholic University of America Press, 2012): 99–128.

[93] John F. Wippel, "Thomas Aquinas and the Unity of Substantial Form," in *Philosophy and Theology in the Long Middle Ages: A Tribute to Stephen F. Brown*, ed. Kent Emery, Jr., Russell L. Friedman, and Andreas Speer (Boston: Brill, 2011), 117–54, esp. 124.

[94] *De Trinitate* q. 6, a. 1. Aertsen, "Method and Metaphysics," 412–4; see Jason A. Mitchell, "The Method of *Resolutio* and the Structure of the Five Ways," *Alpha Omega* 15 (2012): 339–80.

these bones would be part of Socrates's counterpossible definition. On the other hand, *extrinsic* causes consist of efficient and final causes, which offer explanations in light of the "reality" or thing (*secundum rem*), which is not part of the thing's definition. For example, that a boy kicks the ball to score a goal explains according to extrinsic causes why the ball moves. In questions about individuation related to cognition and science, the knower (though not an intrinsic principle of individuation) is an extrinsic, efficient cause of individuation. The knower grasps the individual as such ultimately through the principles of individuation. According to my interpretation, the knower is the agent or efficient cause of the designation of common matter. As an extrinsic cause (*secundum rem*), the human knower designates (i.e., re-integrates through judgment) the likeness or representational content of the intellect (i.e., the common matter) with the likeness or representational content of the sense (i.e., determinate dimensions). I ultimately grasp the feline nature of the individual Tabby by joining my consideration of feline nature under the determinate dimensions of this cat. The designation of common matter must take place for Thomas through some kind of composition: man knows the individual indirectly through the intellect by turning to the dimensions existing in the senses. This human activity entails a "psychosomatic" synthesis of matter re-presented by the intelligible species in the intellect along with the determinate dimensions re-presented by the phantasm existing in the sense: a judgment about *this* snub nose determines (or "signs") flesh-and-blood in general. Matter with or under determinate dimensions provides the ultimate and primary cognitive principle by which we psychosomatically (i.e., through our intellect and sense) grasp Socrates and eventually form the proposition, "Socrates is a man."[95]

In the order of perfection, the subject of individuation or "individuend"—the common nature—requires individuation in order to resolve many questions. Regarding questions about universals, matter with or under determinate dimensions serves to individuate the common nature *tout court* (*In III Sent.* d. 1, q. 2, a.

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[95] *ST* I, q. 86, a. 1 ad 1; *DV* q. 10, a. 5 ad 3. For the interpretation on how judgment for Thomas is "a reflective re-integration of our awareness of the commonality with the individual," see John F. X. Knasas, "The Fundamental Nature of Aquinas' *Secunda Operatio Intellectus*," *Proceedings of the American Catholic Philosophical Association* 64 (1990): 190–202. Knasas thinks that the proposition "Socrates is a man" expresses "not only the joining of a specific nature with designated matter in some individual" but also "the joining of the said individual with its substantial *esse*" (197). Also, *Being and Some Twentieth-Century Thomists* (New York: Fordham University Press, 2003), 182–202. For additional commentary on Thomas's account of singular cognition, see Klubertanz, "St. Thomas and the Knowledge of the Singular," 135–66; Stump, *Aquinas*, 270–73; Daniel D. De Haan, "Aquinas on Perceiving, Thinking, Understanding, and Cognizing Individuals," in *Medieval Perceptual Puzzles: Theories of Sense Perception in the 13th and 14th Centuries*, ed. Elena Băltuță (Brill: Leiden, 2019): 236–68. None of these authors refers to the individuating role of dimensions.

5 ad 1); regarding questions about cognition, matter with or under determinate dimensions serves to individuate the common nature (and so the common matter) as a designated singular apprehended obliquely and psychosomatically by the intellect (*De veritate* q. 10, a. 5; *In II De anima* lect. 12, no. 377); regarding questions about science, determinate dimensions serve to individuate non-designated sensible matter or intelligible matter for the indirect consideration of a scientific intellect, in addition to accounting for counterpossible definitions of the designated singular (*De ente* c. 2; *De veritate* q. 2, a. 6 ad 1). Each of these treatments of individuation raises a difficulty about the non-individual status of the common nature considered complete in itself, and each difficulty is resolved through a consideration of matter with determinate dimensions. This consistency alone shows that Thomas reserves determinate dimensions to one order of the problem of individuation, namely, the order of perfection.

Finally, internal textual evidence renders the consensus view of Wippel and others about the shift in positions extremely unlikely. For the stolid Angelic Doctor to switch positions from one work to the next would in itself be surprising, especially as many of his works are written in the same period. In the middle (1257–58) of this same Parisian regency, during which he wrote the *De veritate* (1256–1259), Thomas gives in *De Trinitate* (q. 4, a. 2) his most sophisticated account of *indeterminate* dimensions as the principle of individuation (within the order of generation as I interpret it), while outright rejecting determinate dimensions. Without recognizing the different orders of consideration, these positions would be contradictory, given that the contemporaneous *De veritate* twice fully supports determinate dimensions as the principle of individuation of corporeal substances. Furthermore, Thomas would be contradicting himself within the same *opuscula*. If one were to accept Wippel and others' view regarding a change in position, that is, one would have to believe that Thomas contradicted himself from one question to the next. After thoroughly rejecting determinate dimensions in the order of generation (q. 4, a. 2), Thomas analyzes in *De Trinitate* (q. 5, a. 2) the problem of individuation related to the sciences in the order of perfection. He states here that the sciences must consider natures without designated matter (*sine materia signata*) because a thing exists here and now as individuated by matter existing under designated or determinate dimensions (*dimensionibus signatis*). It would be stunning had Thomas contradicted himself, with such analytical precision, from one question (q. 4, a. 2) of his *opuscula* to the next (q. 5, a. 2).[96] But the twofold orders of perfection and generation, made evident in the texts examined in this section and the next, avoid this absurdity and ensure an accurate portrayal of Thomas's views on the principle of individuation in matter-form composites.

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[96] Wippel does not consider this text in his chronological approach, presumably because *signatis* is not a variant of *determinatis*. Yet Thomas uses the term "designated" and "determinate" equivalently elsewhere during this time in his career: *In III Sent.* d. 3, q. 4, a. 2, s.c. 2. Also, he later describes matter under designated dimensions (*sub dimensionibus signatis*) as the principle by which a form of the whole is individuated: *In V Meta.* lect. 8, no. 876. Maurer and Gracia both

III. The Order of Generation and the Role of Indeterminate Dimensions

Philosophical analysis of the individual from within the order of generation is quite different from its consideration from within the order of perfection. Whereas in the order of perfection we consider the individual as last in the nature's order of intention (e.g., patient's health; baked bread; Socrates); in the order of generation we consider the individual as first in the order of nature's execution (e.g., performing surgery; baking bread; conceiving Socrates). In the order of generation, we consider the individual as in a flux. The individual's principles are inchoate and unformed. And the question of individuation asks about the reason for individuality. The co-created substantial principles of material things are not of themselves individual. Neither substantial form nor prime matter include in their very nature (*ratione*) numerical distinction, that is to say, divisibility from others of the same kind. Although for Thomas no existing material thing has more than one substantial form, nothing in the substantial form itself explains why it belongs to *this* or *that* individual.[97] The only factor to explain why an oak tree is this or that oak tree is its matter. And yet Thomas holds throughout his career that prime matter is pure potency.[98] Pure potency is entirely indivisible. There is nothing distinguished in prime matter and nothing to distinguish one thing from another, which is why we can state that prime matter is "non-individual stuff."[99] Since it is not able to be divided, prime matter cannot explain the reason for the individual *qua* individual. Since *this* or *that* material substance is clearly individual, though, at least one of its substantial principles must be somehow individual. But the rationale for their individuation is not immediate. The prime matter and substantial form of a cat do not

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agree to treat *signatis* as equivalent to *determinatis*. Maurer twice translates the phrase "*dimensionibus signatis*" as "determinate dimensions." See *St. Thomas Aquinas: The Division and Methods of the Sciences: Question V and VI of his Commentary on the* De Trinitate *of Boethius*, 4th ed. (Toronto: Pontifical Institute of Mediaeval Studies, 1986), 28–9. Gracia even notes the discrepancy regarding the principle of individuation between the two passages but makes no further comment, "A Scholastic Perspective on the Individuation of Races," 145n22.

[97] *De principiis naturae* c. 1; *ScG* III, 3.

[98] *DV* q. 8, a. 6; *DV* q. 21, a. 2 ad 3; *ScG* I, 17; *ST* I, q. 5, a. 3 ad 3; *ST* I, q. 48, a. 3; *QDdA* q. 18 ad 5; *De Malo* q. 1, a. 2; *In XI Meta*. lect. 9, no. 2289. See Wippel, *Metaphysical Thought of Thomas Aquinas*, 312–17.

[99] Jeffrey E. Brower, *Aquinas's Ontology of the Material World: Change, Hylomorphism, and Material Objects* (New York: Oxford University Press, 2014), 119–39.

explain why there is more than one cat. Why is a cat a particular substance if its substantial principles are of themselves non-individual? What principles in the order of generation render the cat a *this*?

Thomas often answers this question with the principle of indeterminate dimensions. Two of his earliest references to indeterminate dimensions are in the commentary on Book II of the *Sentences*, where he explains that dimensive quantity needs to be understood as indeterminate. In one passage, Thomas explains how the forms of individuals are diversified in a species. While discussing whether there are many angels in one species, he explains that diverse parts cannot be present in matter unless at least indeterminate (*ad minus interminata*) dimensive quantity is preunderstood in matter. Quantity is a necessary condition for the divisibility of substance. If quantity were removed from the substance, then the substance would remain indivisible. Negatively stated, there cannot be many angels in a species; affirmatively stated, each angel must be the only individual within its own species. The reason for this uniqueness is that only matter under dimensive quantity diversifies a specific form: only matter under quantity can distinguish *this* form from *that* form. What interests us here is that the matter that receives a corporeal substantial form must include quantitative dimensions that are at least indeterminate. Only matter with diverse parts can receive multiple substantial forms, and matter can only have diverse parts when considered with indeterminate quantitative dimensions. Even if angels were to have corporeal forms, which Thomas rejects, they would still need matter under indeterminate dimensions to diversify such forms.[100]

Later in the commentary, Thomas likewise turns to indeterminate dimensions to answer whether food becomes part of human nature when consumed. He holds that when we are speaking about matter existing in this thing, we are leaving out of consideration absolute or prime matter. Matter is no longer absolute or prime when it is divisible, and it is divisible if it exists in this or that thing. This division of matter happens only if matter is considered under dimensions that are "at least" indeterminate (*saltem interminatis*). Such matter is divisible and so designated. The matter of food should be considered, not as prime matter, but as matter existing in this thing subject to dimensions that are at least indeterminate.[101] Wippel notes that Thomas's language of "at least" (*saltem*) indeterminate dimensions suggests "hesitation" or uncertainty, as if Thomas were wavering about whether indeterminate dimensions would be sufficient to render matter divisible or extendable.[102] But there is no reason to think that Thomas is wavering here. Thomas most often uses the term "saltem" to express a minimal condition (i.e., in the sense of "at the very least"). For example, Thomas repeats part of an argument for God's existence stating that, for the one who hears and understands the name of God, God must already exist at least in the intellect (*saltem in intellectu*).[103] The point is not that God could exist either in the intellect or in reality (*in re*), nor is it that Thomas is expressing hesitation between the two, but the point is rather that existing in the intellect is the minimal condition for someone who understands the name of something, even God. God must at least exist in the intellect of one who actually understands what "God" signifies. Likewise, Thomas's point is not that individuating dimensions could be indeterminate dimensions or determinate dimensions, nor is Thomas expressing hesitation between the two, but the point is rather that indeterminate dimensions is the minimal condition for matter to be made divisible. Dimensions must at the very least be indeterminate if matter is considered as belonging to some body.

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[100] *In II Sent.* d. 3 q. 1, a. 4. The first twentieth-century author to propel the view that Thomas changes his position on individuation may be Roland-Gosselin, who approximates his dates for the *De ente et essentia* based on Thomas's first use of the Avicennian term *signata* in Book I of the commentary on the *Sentences*. The first mention of Averroistic term *dimensiva interminata*, however, appears here in Book II of the commentary on the *Sentences*. See *Le "De ente et essentia" de s. Thomas d'Aquin* (Le Saulchoir: Revue des sciences philosophiques et théologiques, 1926), xxvi–xxviii. Roland-Gosselin claims that Thomas was only later able to remove himself (*se dégager*) from the "prestige" exercised upon him by the Arabic philosophers once he recognized what was required for the theory of the unicity of the substantial form (111–2). But in this very first text Thomas already qualifies that indeterminate dimensions are only "preunderstood" in matter, which is a view not expressed in the Averroist interpretation.

In his commentary on Book IV of the *Sentences*, Thomas considers individuation in the context of the substance of the Eucharist, that is, in the context of matter that belongs to things subject to generation and corruption (i.e., sublunar bodies). He states that in this matter we have to understand indeterminate dimensions before the arrival (*adventum*) of the substantial form. Otherwise, one could not understand the division of matter such that diverse substantial forms exist in diverse parts of matter. These same dimensions taken as existing after the arrival of the substantial form are determinate and complete. Thomas then proceeds to make a peculiar point about the order of generation. He explains that whatever is understood in matter before the arrival of the substantial form remains numerically the same in what is generated and in that from which it is generated, since, when what is posterior is removed, what is prior should remain.[104] The fact that Thomas is discussing matter, substantial form, and the intermediary role of indeterminate dimensions in the order of generation should be clear, but its explanation is not so clear.

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[101] *In II Sent.* d. 30, q. 2, a. 1.

[102] Wippel, *Metaphysical Thought of Thomas Aquinas*, 357 and 363; Porro, *Thomas Aquinas*, 16.

[103] *ScG* I, 10, no. 2.

[104] *In IV Sent.* d. 12, q. 1, a. 2, sol. 4 (Moos ed., 4.513–14). Thomas goes on to state that indeterminate dimensions relate to the genus quantity as matter relates to the genus substance.

What does Thomas mean by “whatever is understood in matter”? Thomas cannot mean that two numerically distinct things share numerically identical dimensions. They would then have to share the same designated matter and so not be numerically distinct. Rather, Thomas must mean that the incomplete or indeterminate dimensions in matter (that from which it is generated) are numerically the same as the complete or determinate dimensions in matter (what is generated).[105] According to his natural philosophy, Thomas is supposing that substantial forms are neither generated nor created; instead, they are educed from matter through an agent cause. Each of the four elements, which are “brought into being immediately by God,”[106] is a composite of an educed substantial form. They are the primary constituents of bodies, comparable to quarks and leptons in contemporary physics; the elements educed from the prime matter interact with one another to form mixed bodies such as wood, flesh, bones, sticks, and stones. The elements in the mixed bodies corrupt in some way, but not entirely, because their active and passive qualities remain. The four elements are “virtual” ingredients of the essence of a mixed body; they are present with respect to their powers (i.e., hot, dry, wet, and cold).[107] By “whatever is understood in matter,” then, Thomas must mean the predisposition of matter caused by the virtual presence of these elements. The element of water can expand through heat until it corrupts and generates the element of air. In this example, the indeterminate dimensions *preunderstood* in the matter of the water at corruption (that from which the air is generated) is numerically identical to the determinate dimensions existing in matter of the air at generation (what is generated). Similarly, the Eucharist can have a maximum and a minimum quantity: adding too much water corrupts the sacrament, but adding a drop of water does not because its indeterminate dimensions remain the same. In order for the sacrament to subsist, Thomas states, it is sufficient that the dimensions remain the same insofar as they are understood as indeterminate. The source of the sacrament's numerical identity, despite an increase or decrease of dimensive quantity, is indeterminate dimensions.[108]

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[105] “I take Thomas to mean by this that the indeterminate dimensions we preunderstand as being present in matter ‘before’ the new substantial form are not really or ontologically distinct from the determinate dimensions that follow upon or ‘after’ that substantial form, and not that numerically the same accidents pass from one substance to another in the natural order.” Wippel, *Metaphysical Thought of Thomas Aquinas*, 365, no. 246. I am in agreement with Wippel on this point.

[106] *CT* I, 95.

[107] *De Trinitate* q. 5, a. 3; *In VII Meta*. lect. 7, no. 1430; *ST* I, q. 76, a. 6, ad 1; *In I De caelo*, lect. 8; *QQ* X, q. 1, a. 3 ad s.c. The elements virtually exist through their qualities, which serve as the disposition by which the mixed body comes to exist. See Joseph Bobik, *Aquinas on Matter and Form and the Elements: A Translation and Interpretation of the* De Principiis Naturae *and the* De Mixtione Elementorum *of St. Thomas Aquinas* (Notre Dame, IN: University of Notre Dame Press); Christopher Decaen, “Elemental Virtual Presence in St. Thomas,” *The Thomist* 64 (2000): 271–300. Thomas’s theory of elements holds that an element that went into a change is not numerically the same as the element existing virtually in the body.

The order of generation consists in the way toward being (*via in esse*), from the non-being of prime matter toward the being of a matter-form composite. So the problem of individuation from within the order of generation examines the in-process character of a substance. It asks how the matter receives the form. The philosophical underbelly to this problem of the individuation of prime matter and substantial form is the problem of whether there is an intermediary or a medium between matter and form, and Thomas consistently rejects the view that the human soul is united to the body through a medium.[109] He rejects the plurality of substantial forms, which would successively determine prime matter with increasing actuality. The point is that Thomas cannot resort to successive forms to explain matter's reception of the form. He also cannot resort directly to the substantial form because the substantial form is not of itself individual; it does not have the limiting character or nature of individuality. He has to resort to an examination of prime matter. But he cannot ask about any *existing* prime matter in this order of generation because prime matter of itself does not exist. So Thomas turns to the predisposition of matter for the substantial form. What must be understood in prime matter for the reception of *this* substantial form? He asks about the intelligible order in matter (*ordinem intelligibilem in materia*). This intelligible order of matter is not merely in our minds. It has a foundation in the thing outside the soul, just as "time" is founded on motion and as "humanity" is founded on man.[110] Similarly, the (logical) relation of reason between man and animal is founded upon some (real) thing; man is ordered to animal as species to genus, as less universal to more universal.

Accordingly, Thomas employs a conceptual or logical principle to examine the individual's matter. This principle states that when what is posterior is removed, what is prior remains (*remoto posteriori oportet remanere prius*). According to this criterion, eliminating the posterior does not thereby eliminate the prior. For example, Socrates is rational (posterior) because man is rational (prior). Even if Socrates and Plato did not exist, the power of rationality would still belong to human nature. Similarly, man is sensate (posterior) because animal is sensate (prior). Even if there were no human persons, the power of sensation would still belong to the animal nature.[111] This priority is in line with the order of generation, in which the imperfect precedes the perfect, and in which the more general (animal) precedes the less general (man). Thomas uses this analytical principle when discussing the resurrection. In the commentary on Book IV of the *Sentences*, Thomas explains that the soul does not assume a new body at the resurrection but rather takes up the same body. Thomas applies the principle to an argument about matter: that which is understood in matter before the form arrives (prior) remains in matter after the substance corrupts (posterior). The reason why matter can remain both before the substantial form arrives and after the substantial form departs is that it is understood with indeterminate dimensions. In the case of matter that belongs to sublunar things, which are generable and corruptible, indeterminate dimensions are understood before the substantial form. It is according to these dimensions that the division of matter may be considered so as to be able to receive diverse forms in diverse parts of matter. And so after the separation of the substantial form from the matter, these indeterminate dimensions remain the same.[112] The argument is not that something is ontologically prior because it is logically prior, which would be a *non sequitur*.[113] The argument is not affirming a positive or mind-independent entity. Just as dimensions are *understood* in the matter before its union with substantial form, dimensions are *understood* in the matter after its union with the substantial form. Thomas is arguing for the logical or rational conditions necessary for an actual individual. The argument remains within the conceptual confines of the thing's intrinsic causes (form and matter). This intelligible order in matter has a remote foundation in things, similarly to the way that "humanity," "truth," and "time" also have a foundation in mind-independent things. The matter ready for the reception of the substantial form at the moment of generation and corruption is not prime matter, but it is rather matter with the corporeal (e.g., genomic) dimensions *understood* for the individual. Although the corpse is human only in an equivocal sense, the withered corpse of Socrates contains some basis by which the intellect can understand his proper dimensions, such as, for example, the remains of his teeth and bones.[114] In terms of modern biology, just as there are at the zygote's generation (i.e., conception) some dimensions that are *understood* in the matter of the gametes, so too there are some dimensions *understood* in the matter of the non-cremated corpse that account for the individual (e.g., DNA molecules).

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[108] *In IV Sent.* d. 12, q. 1, a. 2, sol. 6 ad 5 (Moos ed., 4.517). For similar passages, *QQ* X, q. 1, a. 3; *ST* III, q. 77, a. 8.

[109] *QDdA* a. 3; *De spiritualibus creaturis* a. 3; *ST* I, q. 76, a. 6; *ScG* II, 70; *QQ* XII, q. 6, a. 1.

[110] *In I Sent.* d. 19, q. 5, a. 1: "Quaedam autem sunt quae habent fundamentum in re extra animam, sed complementum rationis eorum quantum ad id quod est formale, est per operationem animae, ut patet in universali," (Mandonnet ed., 1.486). See Robert W. Schmidt, *The Domain of Logic according to Saint Thomas Aquinas* (The Hague: Martinus Nijhoff, 1966), 82–9.

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[111] *QQ* VIII q. 1, a. 1.

[112] *In IV Sent.* d. 44, q. 1, a. 1, qc. 1 ad 3. Also, *In IV Sent.* d. 12, q. 1, a. 2, qc. 4.

[113] For someone who finds this *Scriptum* passage incoherent, see Antonia Fitzpatrick, *Thomas Aquinas on Bodily Identity* (New York: Oxford University Press, 2017), 161.

[114] *ST* I, q. 76, a. 8; *ScG* IV, 81.

The explicit immediate source for Thomas's understanding of indeterminate dimensions is Averroes, whose natural philosophy holds that prime matter is never deprived of indeterminate dimensions. Indeterminate dimensions are the first and immediate form in prime matter.[115] Thomas frequently adds an important qualification and correction, however, that these incomplete dimensions do not pre-exist in matter but are simply preunderstood in the matter. Even though they are prior in the order of generation, indeterminate dimensions do not exist at time$_{t1}$ prior to determinate dimensions at time$_{t2}$ because matter cannot possibly exist independently of form, not even by God's power.[116] Wippel rightly states that there can be "no temporal priority involved here, only priority in the order of nature," namely, priority according to material causality.[117] In the case of the resurrection, just as matter is preunderstood with indeterminate dimensions before the substantial form, so matter maintains these dimensions after the separation of the substantial form from the body. Matter remains with indeterminate dimensions appropriate for its substantial form even after death. Thomas recognizes that matter with determinate dimensions (e.g., *these* hair follicles) frequently change. But just as new wood replenishes with new fuel a numerically identical burning fire, so too food and drink replenishes with new cells a numerically identical boy turned adult. Under natural human circumstances, for Thomas, the same necessary or due quantity of an ensouled body extends to that of the resurrected body and assures its numerical identity.[118]

In this context of the order of generation, we have seen a discussion of 1) the impossibility of more than one angel per species, 2) the dissolution of food in the human organism, 3) the substantial principles of the Eucharist, 4) and the substantial principles of a resurrected body. Thomas turns to indeterminate dimensions to explain the numerical identity of substantial principles in each case. We have not yet seen, however, Thomas's most well-known and sophisticated treatment of individuation as such.[119]

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[115] Averroes, *De Substantia Orbis*, trans. Arthur Hyman, Corpus Philosophorum Medii Aevii, Averrois Hebraicus (Cambridge, MA and Jerusalem, The Medieval Academy of America, 1986), 53–57. For some wider discussion in Averroes, M. Di Giovanni, "Individuation by matter in Averroes' Metaphysics," *Documenti e studi sulla tradizione filosofica medievale* 18 (2007): 187–210.

[116] *QQ* III, q. 1, a. 1. Matter is concreated with the form (*ST* I, q. 7, a. 2, ad 3), inseparable from the composite in the divine mind (*ST* I q. 15, a. 3, ad 3), and identical to its potency for the substantial form (*I Sent.* d. 3, q. 4, a. 2, ad 4).

[117] Wippel, *Metaphysical Thought of Thomas Aquinas*, 356.

[118] *In II Sent*. d. 30, q. 2, a. 1; *ScG* IV, 81; *CT* I, 161; *ST* III, q. 33, a. 2 ad 2; *ST* I, q. 119, a. 1 ad 5; *QQ* IV, q. 3, a. 1. Similarly, organ transplants do not substantially change an animal as long as the necessary quantity (*debitae quantitatis*) remains. For texts and discussion about the resurrection, see Sandra Edwards, "Aquinas on Individuals and their Essences," *Philosophical Topics* 13 (1985): 155–63; Robert Pasnau, *Thomas Aquinas on Human Nature: A Philosophical Study of* Summa theologiae *1a 75–89* (New York: Cambridge University Press, 2004), 392–3.

One glance at question four in Thomas's commentary on Boethius's *De Trinitate* shows that each article under the question relates to individuation. The second article asks whether variety of accidents causes numerical diversity (q. 4, a. 2). Since Thomas overtly rejects determinate dimensions here as a principle of individuation in favor of indeterminate dimensions, it is worth citing:

> Now dimensions can be understood in two ways. In one way, inasmuch as they are determinate, and by this I mean that they have a definite measurement and shape. In this sense, as complete beings (*entia perfecta*) located in the genus of quantity. Now when dimensions are understood in this way they cannot be the principle of individuation, because there is often a variation in such determination of dimensions in the same individual, and thus it would follow that the individual would not always remain the same in number.[120]

Determinate dimensions cannot be the principle of individuation in the order of generation because determinate dimensions often change. The non-Heraclitean assumption is that the same individual persists during the entire span of its existence. If that principle were to change, then what follows from the principle would also change. The principle of individuation within the order of generation for Thomas must permit numerical identity over time. Does this rejection of determinate dimensions indicate a change of mind? Not at all. Thomas merely rejects determinate dimensions as a primary principle of individuation within the order of generation.

On the one hand, questions in the order of generation directly face the issue of time as such. In considering the order of generation, one asks, "what renders the incomplete principles of *x* the principles of *this x*" and "how does the identity of *this x* persist?" This line of questioning takes into account the continuous or dynamic nature of the individual: the individual exists over time as long the individual's due quantity remains. The indeterminate dimensions of the songbird remain as the individual songbird loses the last of its down. By contrast, to take a violent example, decapitating the bird eliminates the quantity due to its matter-form and so destroys its numerical identity. On the other hand, questions in the order of perfection do not face the issue of time as such. The order of perfection asks, "how does one multiply a complete *x*" and "how do I know the singular *x*?" This line of questioning takes into account the discrete or static nature of the individual: the individual exists at any given time as long as it has determinate dimensions. Regarding questions about *universals*, Socrates's determinate dimensions serve to contract the common human nature even as Socrates loses his limbs; but when his body falls to *rigor mortis*, Socrates's determinate dimensions corrupt and no longer serve as individuating the human nature. Regarding *cognitive* questions, I remember the same individual Peter because I cognize him as past, even if he is now maimed or dead, but through memory failure I cannot bring up appropriate phantasms of Peter as a baby. His distinct proportions spread-out by determinate (infantile) dimensions are now lost to me.[121] And regarding *scientific* questions, although a zoologist might keep track of the singular wolf over time through discernible features (e.g., an ear tag), science considers the individual at any given moment through matter under determinate dimensions.

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[119] See Wippel, *Metaphysical Thought of Thomas Aquinas*, 360: "Thomas's fullest statement of his views on individuation appears in his commentary on the *De Trinitate*"; Owens, "Thomas Aquinas (B. CA. 1225; D. 1274)," 173; Bobik, "Dimensions in the Individuation of Bodily Substances," 66–71.

[120] *De Trinitate* q. 4, a. 2 (Leonine ed., 50.125:214–22). Translations of *De Trinitate* (q. 4, a. 2) are taken from Maurer's *Faith, Reason and Theology*, 97–8. Owens explains this passage by mistakenly collapsing the order of perfection and the order generation into a single logical or non-metaphysical order of understanding or notion. Owens, "Dimensive Quantity as Individuating Principle," 289.

In the context of the order of generation, Thomas rejects determinate dimensions because dimensions change over time, but he immediately presents us another way to designate matter:

> In another way dimensions can be taken as indeterminate, simply as having the nature of dimensions, though they can never be without some determination (*numquam sine aliqua determinatione esse possint*), any more than the nature of color can exist without being definitely white or black. Taken in this way dimensions are located in the genus of quantity as something incomplete (*ut imperfectum*). It is through these indeterminate dimensions that matter is made to be this designated matter, thus rendering the form individual. In this way matter causes diversity of number in the same species.[122]

Indeterminate dimensions are the dimensions of the corporeal individual considered precisely in their distinctive nature as dimensions.[123] They are quantitative principles that render matter divisible and so able to receive different substantial forms. How can indeterminate dimensions explain the individual? Thomas compares the nature of color to the nature of dimensions: just as color is necessary to being visible but does not completely exist without determination, so too, dimensions are necessary to being individual but do not completely exist without determination. The comparison might even go further. The nature of color in itself is potentially visible, and it becomes actually visible through natural light. Based on his theory of light at the time, Thomas holds that color serves as a quasi-material cause of visibility and that light serves as a quasi-formal cause of visibility.[124] According to the analogy, Thomas would admit some role in individuation to the substantial form. The nature of dimensions is in itself potentially individual and becomes actually individual through the substantial form. Dimensions serve as a material cause of the individual, or as he later states, they are the "root" cause of the individual.[125] The nature of dimensions places parts outside of parts, so dimensions are a primary and necessary condition for the individual. But the substantial form also serves by giving existence to matter. Apart from the substantial form, *this* finch is only potentially individual, but the substantial form and matter with indeterminate dimensions together make the finch an actual individual.[126]

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[121] For texts on memory, see *In De memoria et reminiscentia* lect. 1, no. 308; *De veritate* q. 10, a. 2; *ST* I, q. 79, a. 6 ad 2. For references to the literature, see Therese Scarpelli Cory, *Aquinas on Human Self-Knowledge* (Cambridge: Cambridge University Press, 2014), 209.

[122] *De Trinitate* q. 4, a. 2 (Leonine ed., 50.125:223–30).

[123] Bobik, "Dimensions in the Individuation of Bodily Substances," 67.

My proposed distinction between the order of generation and the order of perfection should inform our reading of at least one other passage in *De Trinitate* (q. 4, a. 2 ad 3) where Thomas makes an astonishing claim. He states, "even determinate dimensions themselves, which are grounded in the already completed subject, are in a way (*quodammodo*) individuated by matter that has been rendered individual by the indeterminate dimensions that we conceive beforehand in matter."[127] The claim is that indeterminate dimensions individuate prime matter, which itself individuates determinate dimensions, so indeterminate dimensions somehow also individuate determinate dimensions. Does this response show an "inadmissible blurring" of the ontological and epistemological orders? Does Thomas reduce all aspects of individuation to indeterminate dimensions?[128] Not at all. Thomas is rather preserving the respective priority of matter to form in the order of generation. Indeterminate dimensions are the nature of quantity understood in matter in the order of generation analytically prior to the reception of the substantial form, which reception gives existence to matter, thereby completing the matter-form substance with accidental forms such as determinate dimensions.

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[124] A brown finch is only potentially visible apart from light, but color and light together make the brown finch actually visible. See *In I Sent.* d. 45, q. 1, a. 2 ad 1; *In III Sent.* d. 24, q. 1, a. 1, qc. 1; *DV* q. 23, a. 7. For development of Thomas's view of light, see Cory, "Rethinking Abstractionism," 615.

[125] *ScG* IV, 65, no. 5–6.

[126] For Thomas on form giving existence to matter, *DV* q. 28, a. 7; *ST* I, q. 29, a. 2 ad 5; *ST* I, q. 76, a. 6, ad 1; *QDdA* a. 9. Besides giving existence, Thomas also remarks upon the "exigency" of the form for dimensions. See *In II Sent.* d. 30, q. 2, a. 1; *ScG* IV, 81 no. 7. See also Bobik, "L'individuation des substances corporelles," 21.

[127] *De Trinitate* q. 4, a. 2 ad 3 (Leonine ed., 50.126:270–7).

[128] Ingbert Klinger mistakenly thinks that Thomas throughout *De Trinitate* (q. 4, a. 2) confuses the logical and ontological orders in an inadmissible blurring (*unzulässig Verwischung*) by simultaneously asking and answering logical and ontological questions. See *Das Prinzip der Individuation bei Thomas von Aquin: Versuch einer Interpretation und Vergleich mit zwei umstrit-*

The order of generation and the order of perfection do not conflict with one another. There can be a metaphysical priority in the order of generation (form of the part, prime matter, indeterminate dimensions) over the order of perfection (nature or form of the whole, common matter, determinate dimensions). As Thomas states, "we do not say that anything has a nature before it has received a (substantial) form."[129] Prime matter and substantial form must be individuated by indeterminate dimensions (order of generation) before common matter and its common nature can be individuated by determinate dimensions (order of perfection). Thomas's overall account of individuation contains a reciprocal analytical sequence: indeterminate dimensions which have incomplete existence limit prime matter to *this* matter, and *this* divisible matter limits substantial form to *this* form (order of generation); determinate dimensions which have complete existence contract a common nature and inform cognition and the sciences with individuating principles determining the nature as this designated singular (order of perfection).

IV. Conclusion: Later Texts

I have argued that Thomas reserves distinct principles of individuation for different orders: determinate dimensions serve as a principle in the order of perfection, and indeterminate dimensions serve as a principle in the order of generation. I have accordingly argued that Thomas does not change his mind on the question of the individuation of matter-form composites. The apparent Achilles' heel to my (and Bobik's) position is that Thomas later abandons the phrase, "indeterminate dimensions." In fact, his last articulation of individuation in terms of *dimensiones interminatas* is in *De Trinitate* (q. 4, a. 2), and his last mention of the distinction between determinate and indeterminate dimensions is in his discussion of charity's increase in *Quodlibet* IX (1256–59).[130] Yet the silence can be straightforwardly explained: Thomas omits the charged Averroist language of "indeterminate dimensions" because it was identified as support for

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tenen Opuscula (Münsterschwarzach: Vier-Türme-Verlag, 1964), 55. Also, Bobik mistakenly comments that determinate ("terminated") dimensions only individuate insofar as they have the nature of dimensions, not insofar as they are determinate dimensions. Bobik, "Dimensions in the Individuation of Bodily Substances," 69.

[129] *In I Meta*. lect. 4, no. 70 (Marietti ed., 18.23).

[130] *QQ* IX, q. 6, a. 1. Wippel, *Metaphysical Thought of Thomas Aquinas*, 368.

the plurality of substantial forms.[131] The dominant view in the late thirteenth century favored a plurality of substantial forms in the individual, and this pluralism was "one of the classical ways" to reconcile the priority of indeterminate dimensions (to the substantial form) with the primacy of substance.[132] The full implications of the unitarian view (that there is only one substantial form in the individual) was lost even among unitarians as they posited a medium uniting soul and body. Proponents of both the plurality of substantial forms and the unicity of substantial form, that is, turned to indeterminate dimensions as a convenient intermediary between the human substantial form and matter.[133] Though Thomas defends the unicity of substantial form in all substances throughout his career, it seems that Thomas's terminology concerning the unicity of substantial form "became more precise as time went on" and "more sensitive to the possible misunderstanding to which some of his earlier terminology might lead."[134] And his view of indeterminate dimensions involves "a complicated explanation of individuation . . . that can easily be misunderstood."[135] One contemporary reader, Silvia Donati, evinces some of this misunderstanding when she identifies without qualification Thomas's early statements on indeterminate dimensions with the Averroist view, while subsequently "contrasting" Thomas's early statements with the later statements against the unicity of substantial form.[136]

Donati cites later texts where Thomas defends the unicity of the substantial form.[137] In his *Disputed Questions on the Soul* (1265–66), for example, Thomas premises the entire argument against mediating dispositions through a metaphysics of substantial form giving *esse*: "existence is that which most immediately and most intimately belongs to things."[138] His argument is that the first among all acts is existence (*esse*), but matter only has actual existence by the substantial form; so, no accidental dispositions exist before the substantial form. The contemporaneous *Summa theologiae* similarly argues, "it is impossible that any accidental dispositions pre-exist (*praeexistant*) in matter before the substantial form, and consequently before the soul."[139] Donati mistakenly takes these statements, which affirm the unicity of the substantial form, as conflicting with Thomas's earlier statements on dimensions.[140]

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[131] "This controversy seems to have arisen during the final years of Thomas' lifetime." Wippel, "Aquinas and the Unity of Substantial Form," 117. Thomas sometimes jettisons technical language because of its Averroistic associations. For commentary on the jettisoning of *continuatio*, see Klubertanz, "St. Thomas and the Knowledge of the Singular," 145–6; for commentary on the jettisoning of *intellectus passivus*, see Black, "Imagination and Estimation," 74, no. 78.

[132] Donati, "Materia e dimensioni tra XIII e XIV secolo," 370.

[133] For discussion, see Daniel A. Callus, OP, "The Origins of the Problem of the Unity of Form," *The Thomist* 24 (1961): 257–85; "Forms: Unicity and Plurality of," in *New Catholic Encyclopedia*, 2nd ed., vol. 5 (Detroit: Gale, 1967), 816–9; Emily Michael, "Averroes and the Plurality of Forms," *Franciscan Studies* 52 (1992): 155–83.

[134] Wippel, *Metaphysical Thought of Thomas Aquinas*, 350–51.

[135] Ibid., 365. One recent author similarly describes Thomas's indeterminate dimensions as a "complicated explanatory manoeuvre." Fitzpatrick, *Thomas Aquinas on Bodily Identity*, 161–2.

[136] Donati, "Materia e dimensioni tra XIII e XIV secolo," 370. In her brief discussion of indeterminate dimensions in Thomas, Donati does not question the "line of interpretation widely accepted by scholars" that Thomas's position on matter and dimensions indicates an "evolution" (367). Donati published her study more recently (2007) but only cites a later reprint of Roland-Gosselin's (1926) and Klinger's (1964) account. She does not cite Umberto Degl'Innocenti, "Il pensiero de San Tommaso sul principio d'individuazione," *Divus Thomas* 45 (1942): 35–81.

[137] For a discussion of the unicity of substantial form, see Wippel, *Metaphysical Thought of Thomas Aquinas*, 327–50.

Yet the early Thomas explicitly held that dimensions do *not* preexist in matter and are rather only *understood* (or *preunderstood*) prior to the substantial form. Texts in the *Scriptum* make this clear: "it is necessary to understand (*intelligere*) in generable and corruptible matter indeterminate dimensions prior to the arrival of the substantial form; otherwise one could not understand (*intelligere*) the division of matter";[141] "the substantial form of a material thing has in some way an order to dimensions, since indeterminate dimensions are preunderstood (*praeintelligantur*) in matter before the substantial form.[142] Texts in the *De Trinitate* maintain the same crucial qualification: determinate dimensions are individuated "in a way out of matter that is individuated by indeterminate dimensions preunderstood (*preintellectas*) in matter."[143] Thomas accuses one objector's argument as proceeding "from complete accidents, which follow the existence of (substantial) form in matter, but not that of indeterminate dimensions, which are preunderstood (*praeintelliguntur*) before the same form in matter."[144] Again, in the *De veritate*, Thomas clarifies that before natural forms arrive, "dimensions are preunderstood (*praeintelliguntur*) in matter in incomplete act, not of complete act."[145] These indeterminate dimensions are, Thomas expressly states, first in the order of matter and of generation. The upshot is that the early Thomas explicitly and consistently safeguards the priority of substance to accident in his discussion of individuating dimensions.

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[138] *QDdA* a. 9: "esse est illud quod immediatius et intimius conuenit rebus," (Leonine ed., 24/1.79:139–41). Thomas clarifies the question of intermediary forms in a number of passages: *In II Sent.* d.1, q. 2, a. 4, ad 3; *In II Sent.* d. 18, q. 1, a. 2; *ScG* II, 71; *De spiritualibus creaturis*, a. 3; *ST* I, q. 76, aa. 6 & 7.

[139] *ST* I, q. 76, a. 6: "impossibile est quod quaecumque dispositiones accidentales praeexistant in materia ante formam substantialem; et per consequens neque ante animam," (Leonine ed., 5.229).

[140] Donati, "Materia e dimensioni tra XIII e XIV secolo," 370.

[141] *In IV Sent.* d. 12, q. 1, a. 2, qc. 4 (Moos ed., 4.513).

[142] Ibid., d. 12, q. 1, a. 3, qc. 1 ad 3 (Moos ed., 4.520). See also ibid., d. 44, q. 1, a. 2, qc. 5 ad 3.

[143] *De Trinitate* q. 4, a. 2 ad 3 (Leonine ed., 50.126:270–7).

[144] Ibid., q. 4, a. 2 ad 5 (Leonine ed., 50.126:287–92)

[145] Ibid., q. 5, a. 9 ad 6 (Leonine ed., 22/1.165:357–62).

Donati cites two later texts where she claims that Thomas rejects the view that some accidental determinations could remain numerically identical upon the corruption of the substance that serves as their substrate. In one passage from the *Summa contra Gentiles*, Thomas states that corporeity as an accidental form—the three dimensions which constitute the nature of the body—yields to nothing (*nihilum cedit*) at death.[146] In the *Scriptum* passage which Donati cites as conflicting, Thomas states that, after the separation of the substantial form from the matter (i.e., after corruption), those indeterminate dimensions understood in the matter still remain the same. Yet these passages do not conflict. Whereas the *Summa contra Gentiles* is referring to accidental form of quantity (determinate dimensions) yielding to nothing after death, the *Scriptum* passage is referring to indeterminate dimensions understood in matter persisting after death. Unlike determinate dimensions, indeterminate dimensions are not accidental forms; they are rather the nature of dimensions understood in matter. In fact, the previous paragraph of the very same passage (*ScG* IV, 81) directly supports the *Scriptum* passage. Thomas argues that matter remains under the same dimensions: "none of man's essential principles yields entirely to nothing in death, for the rational soul which is man's form remains after death," and Thomas continues, "the matter also, which was subject to such a form, remains under the same dimensions which made it able to be the individual matter" (*habebat ut esset individualis materia*).[147] In later years, Thomas abandons the term "indeterminate dimensions," but he maintains the same view that the dimensions, which render (prime) matter individual, continue even after death.

Donati cites another later work, *On Spiritual Creatures*, where Thomas explains that the qualities in one corrupted element (e.g., air) are not numerically the same in the generated element (e.g., fire). Thomas gives the example of the quality of heat. The heat that was in the air is not numerically the same as the heat that is now in fire because the subject changes: the heat in the air corrupts because the air corrupts.[148] The supposed contrast to the same *Scriptum* passage states, "what is understood in matter before the form remains in matter after its corruption."[149] In a previous section (III), I have maintained (with Wippel) that Thomas does not take these statements about the priority of indeterminate dimensions in terms of duration; it rather concerns the order of nature, specifically the order of generation according to material causality. I also stated that "whatever is understood in matter" means the predisposition of matter caused by the virtual presence of these elements (hot, dry, wet, and cold). This predisposition is not the virtual presence itself, but rather an effect of the virtual presence. So a numerical change in the virtual presence of elements does not necessarily change the identity of the individual. The early Thomas makes the same point in a *Scriptum* passage where he argues by analogy to the elements that the organs of a resurrected body will be numerically the same even though their sensate powers are not numerically the same. His analogy holds that the numerically same fire would remain even if a numerically different heat were in it. And his example to argue his point is water: the coldness of water does not return numerically the same after the water is heated, yet the water remains numerically the same.[150] If elements or mixed bodies do not numerically change despite their changing qualities, then there should be no reason why individual substances change despite their changing qualities.

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[146] *ScG* IV, 81, no. 7.

[147] Ibid.,, 81, no. 6 (Leonine ed., 15.252). Mod. trans. from Charles J. O'Neil.

[148] *De spiritualibus creaturis* a. 3 ad 19. Bobik and Degl'Innocenti write of a "corrective insight" to Averroes. Bobik, "Dimensions in the Individuation of Bodily Substances," 67; Degl'Innocenti, "Il pensiero de San Tommaso sul principio d'individuazione," 56. But the so-called correction Thomas offers seems unintentional. As late as *De spiritualibus creaturis* (1267–68), Thomas still seems to interpret the Commentator as holding that matter receives the corporeal form in the intelligible order alone (*secundum rationem intelligibilem tantum*). See *De spiritualibus creaturis* a. 3 ad 17 & ad 18.

The justification Thomas gives for why form is united to matter without any medium at all is that the act of a body strictly belongs to a substantial form. In the order of perfection, substantial form gives existence (*esse*) to non-actual matter. If matter had an intermediary form (e.g., a corporeal form actualizing the matter with a body), then the matter would have existence through that intermediary form. Substantial form would not be giving existence to the matter. By turning to the order of generation, however, Thomas can analyze the necessary conditions for the reception of the substantial form by the matter out of which a substance is generated. These necessary conditions include pre-dispositions in the matter. In the *Summa contra Gentiles* (1261–65), Thomas indeed makes a crucial exception for this priority within the order of generation:

> Even so, it can be said that there is a medium between the soul and the body, not in existing (*non in essendo*), but in moving and in the order of generation (*in movendo et in via generationis*). . . . In the order of generation, dispositions to a form precede the form in matter, although they are posterior to it in existing (*in essendo*). That is why the body's dispositions, which make it the proper perfectible subject of such a form, may thus be called intermediaries between the soul and the body.[151]

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[149] *In IV Sent.* d. 44, q. 1, a. 1, qc. 2 ad 3 (Busa ed., 1.635c).

[150] Ibid., d. 44, q. 3, a. 3 qc. 1 ad 6.

[151] *ScG* II, 71, no. 3 (Leonine ed., 13.454). "The organization of the body precedes in the order of generation the introduction of the rational soul" (*ScG* IV, 44, no.5). In this passage,

This text states that an intermediary between the soul and the body can be understood (though not existing) in the order of generation. These intermediaries are disposition of the matter for the substantial form, and dimensions are the first, immediate, and proximate dispositions of matter.[152] So these dimensions parcel the matter to receive a substantial form. Despite the vehement prohibition against intermediary forms in the matter, Thomas recognizes even later in his career that dimensions account for matter's ability to receive the substantial form. His analysis of individuation in the order of generation ensures that matter can receive the substantial form because of the predisposition in the matter for the form, that is, because of (indeterminate) dimensions with incomplete existence in the matter.

Finally, as I already suggested, Thomas implicitly relies on indeterminate dimensions later in his career. He resolves the same concerns (the Eucharistic species, the resurrected body) through implicit references to the same solution: indeterminate dimensions. We can infer that these texts imply indeterminate dimensions because they rely upon identical characteristics that indeterminate dimensions have in contrast to determinate dimensions. For example, in *Summa theologiae* III, Thomas states that the individuation of wine is based on the quantity and the form of the liquid. If what is added to the liquid is a small amount of the same form (such as a drop of wine with wine), then there is only change in the part of the whole that was permeated. If the amount of the same form is great enough to permeate the whole, then the substance changes numerically.[153] When faced with the objection that any change in quantity alters the substance completely, Thomas replies that the great and the small diversify dimensive quantity, not as to its essence, but as to the determination of its measure.[154] We can easily rephrase this response in Thomas's earlier language: a great or small change in the substance's quantity only alters its determinate dimensions ("determination of measure"); it does not change its indeterminate dimensions ("the essence of a thing's quantity"). Whether he writes in terms of the essence or nature of dimensions (*natura tantum*),[155] dimensions that do not vary,[156] or dimensions that are understood (*intelligitur*) before the substantial form,[157] Thomas signifies

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Thomas argues based on philosophical anthropology that Christ must have assumed an organized body because the (human) soul from its beginning is united to the body.

[152] *ST* III, q. 77 a. 2: "prima dispositio materiae est quantitas dimensiva" (Leonine ed., 12.196). See also *In IV Sent*. d. 12, q. 1, a. 2, qc. 3 ad 2.

[153] *ST* III, q. 77, a. 8 (Leonine ed., 12.203–4).

[154] *ST* III, q. 77, a. 8, ad 4 (Leonine ed., 12.204).

[155] *ST* III, q. 77, a. 8.

[156] *QQ* X, q. 1, a. 3. For the different dates of *QQ* X, see Torrell, *Saint Thomas Aquinas*, 211.

[157] *QDdA*, a. 9; *ST* I, q. 76, a. 7 ad 2; *De spiritualibus creaturis* a. 3 ad 18. For further references to later texts that imply indeterminate dimensions, see Bobik, "La doctrine de saint Thomas sur l'individuation des substances corporelles," 31.

the same type of dimensions later in his career as he does earlier in his career, namely, indeterminate dimensions. Since the earlier texts we examined describe dimensions in the same way, there is no reason to think the Friar later changes his mind on the principle of individuation of corporeal substances.[158]

Dominican University College
Ottawa, Ontario

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[158] I am grateful for the comments of those who read or heard earlier versions of this paper. Despite disagreeing with the conclusion, John F. Wippel kindly supervised its writing in the form of a Masters thesis in 2011. The careful reading of the editor and two blind reviewers of the *American Catholic Philosophical Quarterly* also led to substantial clarifications.